

6. Materials Received:

Description	Quantity	No. of Trucks	Compliant with Specs?
Not applicable			

7. Submittals Reviewed and Approved:

Submittal Number(s)	Applicable Specification/Plan Section	Approved By	Action
Not applicable			

8. Verbal Instructions Given/Controversial Matters:

Several of the surface soil sample locations were difficult to advance with the use of a hand auger due to concrete rubble and rock fill. It was agreed between Dan Price and field staff that a spud bar would be used to loosen the rubble and rocks in order to advance to the termination depth of 2' bgs.

9. Job Safety: (Report violations; corrective instructions given; corrective action taken)

A site safety meeting was held onsite. Inclement weather was discussed, as severe storms were likely in the area. Potential hazards, PPE, emergency contacts, hospital route, and BBLPS procedures were discussed. No safety violations were observed.

10. Remarks:

None.

11. Lost Days/Time Impacts/Equipment Repairs:

Sampling activities were halted due to severe thunderstorms that rolled through the area from 0700 to 0945 and from 1200 to 1300. Thunderstorms included heavy rain, lightning, and pea-sized hail.

12. Near Future Plans

- Surface soil sampling will commence on 05/14/08 (6 locations are left)
- MIP investigation will begin at 0800 on 05/14/08
- Shallow monitoring well installation will begin on 05/16/08

On behalf of Conti Environmental, Inc. and its' subcontractors, I certify that this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as noted.

Tony Swierczek/13May08

Field Team Leader, CH2M HILL / Date

DAILY QUALITY CONTROL REPORT

Daily Report No: 011

Date: 05/14/08

Weather: Clear and sunny

Precip.: No

°F Temp: Min: 50 Max 80

1. Personnel and Area(s) of Responsibility:

# of Personnel	Trade/Title	Hours (each)	Employer	Location/Work Description
1	Field Team Leader	10	CH2M HILL	MIP Investigation
1	Field Team Member	9	CH2M HILL	Surface soil sampling
1	Field Team Member	9	CH2M HILL	Surface soil sampling
3	MIP Subcontractor	9	Precision Sampling	MIP Investigation
1	QC Officer	1	CH2M HILL	Completion of initial phase QC checklist
1	USACE Geologist	6	USACE	Site visit
1	89 th RRC Consultant	6	WD Enterprises	Site visit
1	89 th RRC Consultant	2	WD Enterprises	Site visit

2. Equipment Used:

Equipment Description	Qty.	Date of Arrival	Date of Safety Check
Hand Auger	2	NA	05/14/08
Geoprobe 6625 DPT rig	1	05/14/08	05/14/08
Mobile lab vehicle	1	05/14/08	05/14/08

3. Work Performed Today:

Surface Soil Sampling

2 CH2M HILL staff collected composite surface soil samples (0-2' bgs) at the remaining 6 locations near former Building 220 and near the Southern site boundary. Lead samples collected "offsite" south of the site boundary were submitted for 24-hr TAT, and the remaining samples submitted for 10-day TAT. The samples were placed on ice and sent to PEL Labs via FedEx (priority overnight). All sample locations were abandoned with bentonite chips and filled from 6" to ground surface with topsoil.

MIP Investigation

CH2M HILL staff began the MIP investigation in the vicinity of former Building 220. An initial MIP boring was advanced upgradient of the known contamination to establish background responses. However, high MIP responses at 22.5' and saturation at 26-30 feet bgs excluded this boring as a background response boring (MIP refusal at 31.11' bgs). A second boring was advanced approximately 60' East of the original background MIP boring. No impact was observed at this location (refusal at 37.16' bgs). A third MIP boring was advanced in the source area. Impact was observed at ~10' bgs, with saturation of the membrane from 14.5-21.5' bgs. MIP response was declining to MIP refusal at 22.13' bgs. Please note, CPT refusal is 3 feet deeper than MIP refusal, as the CPT tool is stacked beneath the MIP tool.

4. Results of Control Activities:

Not applicable

5. Tests Performed as Required by Plans and/or Specifications:

Not applicable

6. Materials Received:

Description	Quantity	No. of Trucks	Compliant with Specs?
Not applicable			

7. Submittals Reviewed and Approved:

Submittal Number(s)	Applicable Specification/Plan Section	Approved By	Action
Not applicable			

8. Verbal Instructions Given/Controversial Matters:

Jeff Haberl and I discussed the need to advance a second MIP boring East of the original background MIP boring, due to high MIP response observed at the original background location. It was agreed to advance a second MIP background boring approximately 60 feet East of the original location. No impact was observed. We will discuss the next steps to define the impact observed at the original MIP background boring location with Dan Price.

9. Job Safety: (Report violations; corrective instructions given; corrective action taken)

A site safety meeting was held onsite. Inclement weather was discussed. Reviewed the site security plan with Precision. Potential hazards, PPE, emergency contacts, hospital route, and BBLPS procedures were discussed. No safety violations were observed.

10. Remarks:

None.

11. Lost Days/Time Impacts/Equipment Repairs:

None.

12. Near Future Plans

- MIP investigation will continue at 0700 on 05/15/08
- Shallow monitoring well installation will begin on 05/16/08

On behalf of Conti Environmental, Inc. and its' subcontractors, I certify that this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as noted.

Tony Swierczek/14May08

Field Team Leader, CH2M HILL / Date

DAILY QUALITY CONTROL REPORT

Daily Report No: 012

Date: 05/15/08

Weather: Rain and windy

Precip.: Yes

°F Temp: Min: 50 Max 62

1. Personnel and Area(s) of Responsibility:

# of Personnel	Trade/Title	Hours (each)	Employer	Location/Work Description
1	Field Team Leader	11	CH2M HILL	MIP Investigation
1	Field Team Member	4	CH2M HILL	MIP Investigation
1	Field Team Member	5	CH2M HILL	MIP Investigation
3	MIP Subcontractor	10	Precision Sampling	MIP Investigation
1	USACE Geologist	4	USACE	Site visit
1	89 th RRC Consultant	1	WD Enterprises	Site visit
1	89 th RRC Consultant	6	WD Enterprises	Site visit

2. Equipment Used:

Equipment Description	Qty.	Date of Arrival	Date of Safety Check
Geoprobe 6625 DPT rig	1	05/14/08	05/15/08
Mobile lab vehicle	1	05/14/08	05/15/08

St. Louis Ordnance Plant, Former Hanley Area

Remedial Investigation

St. Louis, Missouri

**3. Work Performed Today:****MIP Investigation**

CH2M HILL staff continued the MIP investigation in the vicinity of former Building 220. MIP boring MIP-04 was advanced approximately 30 feet southwest of the MIP-03 (source area), near the southwest sewer inlet at the loading dock. Initial elevated ECD responses were observed at 5 feet bgs, with a maximum ECD response of 1.3E6 uV at 20 feet bgs. This response is well below the maximum response observed at the source MIP boring. Response declined to near baseline at 21 feet bgs. MIP refusal was encountered at 22.06 feet bgs (CPT refusal at 25.06 feet bgs).

MIP boring MIP-05 was advanced approximately 30 feet northeast of the source MIP boring. Initial elevated ECD response was observed beginning at 4 feet bgs, increasing to maximum ECD response of 8.77E6 uV from 14 feet bgs to MIP refusal at 23.11 feet bgs.

A third MIP boring (MIP-06) was attempted approximately 30 feet southwest of MIP-04. However, debris at approximately 5.5 feet bgs deflected the probe rod, preventing further advancement. The probe was retracted and a decision was made to shut down work for the day due to unsafe working conditions (rained all day, creating a slip hazard while working on the hillside, issue with trying to get the mobile lab truck up the hill). The MIP boring in this location will be adjusted and a second attempt will be made tomorrow.

Please note, CPT refusal is 3 feet deeper than MIP refusal, as the CPT tool is stacked beneath the MIP tool.

4. Results of Control Activities:

Not applicable

5. Tests Performed as Required by Plans and/or Specifications:

Not applicable

6. Materials Received:

Description	Quantity	No. of Trucks	Compliant with Specs?
Not applicable			

7. Submittals Reviewed and Approved:

Submittal Number(s)	Applicable Specification/Plan Section	Approved By	Action
Not applicable			

8. Verbal Instructions Given/Controversial Matters:

Dan Price suggested we advance a MIP boring south of the initial MIP boring that was originally designated as our "background MIP boring" (MIP-01). However, maximum ECD response was observed at MIP-01, thereby requiring an additional boring further east to establish a true background response value. A MIP boring west of MIP-01 will be advanced near the west site boundary to delineate contamination.

During advancement of MIP-06, the CPT data collector (Datapack) began to malfunction. The field staff inspected all lines and the connection to the CPT probe; all were in proper working order. It was concluded that the connection within the Datapack was not functioning properly. The manufacturer was contacted for advice. Precision was able to fix the problem and proceed with advancement of MIP-06. During advancement of MIP-06, debris was encountered at 5.5 feet bgs, causing the probe rod to deflect and tearing the piezofilter on the CPT probe. A decision was made to end the day due to deteriorating conditions at the site (steady rain all day while working on a hillside).

9. Job Safety: (Report violations; corrective instructions given; corrective action taken)

A site safety meeting was held onsite. Inclement weather was discussed. Reviewed the site security plan with Precision. Potential hazards, PPE, emergency contacts, hospital route, and BBLPS procedures were discussed. No safety violations were observed.

10. Remarks:

None.

11. Lost Days/Time Impacts/Equipment Repairs:

1 hour was spent troubleshooting the problem with the Datapack. Once the Datapack was repaired, the remote for the Geoprobe rig stopped working. Approximately 1 hour was spent troubleshooting and repairs. Precision had a very difficult time mobilizing from one MIP location to another due to saturated ground from steady rain. Approximately 1.25 hours was spent trying to mobilize the mobile lab truck up the hill when leaving the site. The Geoprobe rig was used to help pull it out of the ruts. Extensive rutting has occurred at the investigation area due to the wet conditions. The rutting will be repaired at the completion of field activities

12. Near Future Plans

- MIP investigation will continue at 0700 on 05/16/08
- Shallow monitoring well installation will begin on 05/16/08

On behalf of Conti Environmental, Inc. and its' subcontractors, I certify that this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as noted.

Tony Swierczek/15May08

Field Team Leader, CH2M HILL / Date

DAILY QUALITY CONTROL REPORT

Daily Report No: 013

Date: 05/16/08

Weather: Clear and sunny

Precip.: No

°F Temp: Min: 50 Max 78

1. Personnel and Area(s) of Responsibility:

# of Personnel	Trade/Title	Hours (each)	Employer	Location/Work Description
1	Field Team Leader	12	CH2M HILL	MIP investigation near former Building 220
1	Field Team Member	9	CH2M HILL	Monitoring well installation near 6317 Stratford Avenue
1	Field Team Member	10	CH2M HILL	Monitoring well installation near 6317 Stratford Avenue
3	MIP Subcontractor	11	Precision Sampling	MIP Investigation near former Building 220
2	Driller Subcontractor	10	MRK Environmental Exploration	Monitoring well installation near 6317 Stratford Avenue

2. Equipment Used:

Equipment Description	Qty.	Date of Arrival	Date of Safety Check
Geoprobe 6625 DPT rig	1	05/14/08	05/16/08
Mobile lab vehicle	1	05/14/08	05/16/08
CME 45 Drill rig	1	05/16/08	05/16/08

3. Work Performed Today:

MIP Investigation

CH2M HILL staff continued the MIP investigation in the vicinity of former Building 220. The MIP subcontractors attempted to break through the asphalt road, southwest of MIP-01. The purpose of this boring was to delineate impact upgradient of MIP-01. Several attempts were made to break through the asphalt road to advance the boring. The drilling subcontractors were utilized to core through concrete that was observed beneath the asphalt. At least 12" of concrete exists underneath the asphalt, as the 12" core bit did not core through the entire thickness of the concrete. It was discussed between CH2M HILL staff that the only option would be to advance the boring on the south side of the fence, north of 219B (MIP-07). MIP-06 was advanced approximately 30 feet southwest of MIP-04, the boring that exhibited moderate ECD response. Refusal was encountered at 3' bgs, therefore the boring was offset 15 feet to the west. No impact was observed at MIP-06, with MIP refusal at 25.11' bgs. The next MIP boring (MIP-07) was advanced north of 219B. No impact was observed at this location, with MIP refusal at 39.04' bgs. MIP-08 was advanced 21 feet west of MIP-01 to delineate impact near the property boundary. Refusal was encountered at 5' bgs, therefore the boring was offset 3 feet to the north. No impact was observed at this location, with refusal at 32.64' bgs.

Please note, CPT refusal is 3 feet deeper than MIP refusal, as the CPT tool is positioned beneath the MIP sensor. All borings were abandoned with cement-bentonite grout from the bottom of the boring to ground surface.

Shallow Monitoring Well Installation

Drilling subcontractors were onsite to install one shallow monitoring well near the southeast corner of the residence at 6317 Stratford Avenue. The boring was advanced to 35' bgs and logged per the USCS, with weathered shale observed at approximately 26' bgs and black, organic lean clay observed at approximately 34' bgs. The boring was backfilled with bentonite chips from 35-30' bgs and with sand filter pack from 30-28' bgs. A 2" PVC monitoring well equipped with a 10-foot, 10 slot screen was installed from 28' bgs (the perceived bedrock surface) to ground surface. The annular space was completed with sand filter pack from 28-16' bgs, a hydrated bentonite plug from 16-14' bgs, and cement-bentonite grout from 14' bgs to ground surface.

Two drums of soil IDW was generated during soil boring activities related to monitoring well installation. One drum of decontamination water was drummed in a 55-gallon drum.

4. Results of Control Activities:

Not applicable

5. Tests Performed as Required by Plans and/or Specifications:

Soil cores generated during soil boring activities were field screened with a MultiRAE equipped with a 10.7 eV lamp for VOC detection.

6. Materials Received:

Description	Quantity	No. of Trucks	Compliant with Specs?
Not applicable			

St. Louis Ordnance Plant, Former Hanley Area

Remedial Investigation

St. Louis, Missouri

**7. Submittals Reviewed and Approved:**

Submittal Number(s)	Applicable Specification/Plan Section	Approved By	Action
Not applicable			

8. Verbal Instructions Given/Controversial Matters:

Prior to advancement of MIP-06, the CPT data collector (Datapack) appeared to be malfunctioning. The field staff inspected all lines and the connection to the CPT probe; all were in proper working order. It was concluded that the connection between the planetary cable and the top of the probe came loose. The cable was reconnected and stabilized prior to advancement of MIP-06.

9. Job Safety: (Report violations; corrective instructions given; corrective action taken)

A site safety meeting was held onsite. The placement of the mobile lab vehicle was the highlight of the tailgate meeting with Precision. Due to poor ground conditions yesterday, it was agreed that the vehicle would remain either on top of the hill or on the road at the bottom of the hill to access all of the MIP boring locations. Traffic hazards and traffic control measures were discussed with MRK. Reviewed the site security plan with Precision and MRK. Potential hazards, PPE, emergency contacts, hospital route, and BBLPS procedures were discussed. No safety violations were observed.

10. Remarks:

None.

11. Lost Days/Time Impacts/Equipment Repairs:

MRK spent 1 hour trying to core through the concrete on top of the hill at the former Building 220 area to aid the progress of the MIP investigation. Attempts at coring through the concrete were unsuccessful.

Two hours was spent troubleshooting the problem with the CPT probe. Once the connection was re-established, the MIP investigation proceeded without delay.

12. Near Future Plans

- MIP investigation will continue at 0700 on 05/17/08
- Surface completion of the shallow monitoring well at 6317 Stratford will resume on 05/19/08
- Shallow monitoring well installation near MIP-07 will begin on 05/19/08
- Soil and groundwater confirmation sampling will begin the week of May 19

On behalf of Conti Environmental, Inc. and its' subcontractors, I certify that this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as noted.

Tony Swierczek/16May08

Field Team Leader, CH2M HILL / Date

DAILY QUALITY CONTROL REPORT

Daily Report No: 014

Date: 05/17/08

Weather: Clear and sunny

Precip.: None

°F Temp: Min: 50 Max 80

1. Personnel and Area(s) of Responsibility:

# of Personnel	Trade/Title	Hours (each)	Employer	Location/Work Description
1	Field Team Leader	6	CH2M HILL	MIP investigation at former Building 220 area
1	Field Team Member	7	CH2M HILL	MIP investigation at former Building 220 area
3	MIP Subcontractor	11	Precision Sampling	MIP investigation at former Building 220 area

2. Equipment Used:

Equipment Description	Qty.	Date of Arrival	Date of Safety Check
Geoprobe 6625			
Mobile lab support vehicle			

3. Work Performed Today:

MIP Investigation

CH2M HILL staff and Precision Sampling continued the MIP investigation at the former Building 220 area. MIP-09 was advanced to delineate impact observed at MIP-04. It was positioned approximately 30' west of MIP-04. MIP probe refusal was encountered at 29' bgs with no impact observed.

MIP-10 was advanced on the north side of the concrete pad formerly used as a loading area. The location was offset several times due to obstructions in the subsurface. MIP refusal was encountered at 26' bgs with impact observed just above the baseline response.

MIP-11 was advanced approximately 30' southwest of MIP-10 (upgradient). MIP refusal was encountered at 31' bgs with no impact observed.

MIP-12 was advanced on the east side of the concrete pad formerly used as a loading area. MIP refusal was encountered at 19-20' bgs with low-level impact observed.

MIP-13 was advanced approximately 23' northeast of MIP-12. MIP refusal was encountered at 26' bgs with medium-level impact observed from 18-19' bgs and from 22.5-23' bgs.

All MIP borings were abandoned with cement-bentonite grout from the bottom of the boring to ground surface.

Note: MIP refusal is 3 feet above CPT probe refusal due to its configuration.

4. Results of Control Activities:

Not applicable

5. Tests Performed as Required by Plans and/or Specifications:

Not applicable

6. Materials Received:

Description	Quantity	No. of Trucks	Compliant with Specs?
Not applicable			

7. Submittals Reviewed and Approved:

Submittal Number(s)	Applicable Specification/Plan Section	Approved By	Action
Not applicable			

8. Verbal Instructions Given/Controversial Matters:

None.

9. Job Safety: (Report violations; corrective instructions given; corrective action taken)

A site safety meeting was held on site. A Pre-task Safety Plan, SWO form, and Drilling Assessment Checklist were completed. No safety violations were observed.

10. Remarks:

None.

11. Lost Days/Time Impacts/Equipment Repairs:

12. Near Future Plans

- The MIP investigation will continue tomorrow, with a focus on the eastern edge of the plume.
- Monitoring well installation is scheduled for May 19, with casing installation for the deep well scheduled for May 20, 2008.

On behalf of Conti Environmental, Inc. and its' subcontractors, I certify that this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as noted.

Tony Swierczek/17May08

Field Team Leader, CH2M HILL / Date

DAILY QUALITY CONTROL REPORT

Daily Report No: 015

Date: 05/18/08

Weather: Clear and sunny/windy Precip.: None °F Temp: Min: 50 Max: 80

1. Personnel and Area(s) of Responsibility:

# of Personnel	Trade/Title	Hours (each)	Employer	Location/Work Description
1	Field Team Leader	13	CH2M HILL	MIP investigation at former Building 220 area
3	MIP Subcontractor	12	Precision Sampling	MIP investigation at former Building 220 area

2. Equipment Used:

Equipment Description	Qty.	Date of Arrival	Date of Safety Check
Geoprobe 6625			
Mobile lab support vehicle			

3. Work Performed Today:

MIP Investigation

CH2M HILL staff and Precision Sampling continued the MIP investigation at the former Building 220 area. Today's activities focused on the low-level response observed at MIP-12 and the medium-level response at MIP-13. MIP-14 was advanced approximately 30' south of MIP-12 and 30' southeast of MIP-10. MIP probe refusal was encountered at 32.50' bgs. ECD response just above baseline was noted at 8-9' bgs.

MIP-15 was positioned approximately 25' southeast of MIP-12. MIP refusal was encountered at 34' bgs with no impact observed.

MIP-16 was positioned approximately 25' east of MIP-13. MIP refusal was encountered at 31' bgs with no impact observed.

MIP-17 was positioned approximately 25' northeast of MIP-13. MIP refusal was encountered at 25' bgs with ECD response just above baseline.

MIP-18 was advanced approximately 30' west of MIP-03 to delineate the western edge of the plume. MIP refusal was encountered at 27' bgs with no impact observed.

MIP-19 was advanced 25' southwest of MIP-03 to delineate the western edge of the plume. MIP refusal was encountered at 22' bgs with ECD response just above baseline observed.

All MIP borings were abandoned with cement-bentonite grout from the bottom of the boring to ground surface.

Note: MIP refusal is 3 feet above CPT probe refusal due to its configuration.

4. Results of Control Activities:

Not applicable

5. Tests Performed as Required by Plans and/or Specifications:

Not applicable

6. Materials Received:

Description	Quantity	No. of Trucks	Compliant with Specs?
Not applicable			

7. Submittals Reviewed and Approved:

Submittal Number(s)	Applicable Specification/Plan Section	Approved By	Action
Not applicable			

8. Verbal Instructions Given/Controversial Matters:

None.

9. Job Safety: (Report violations; corrective instructions given; corrective action taken)

A site safety meeting was held on site. A Pre-task Safety Plan was completed. No safety violations were observed.

10. Remarks:

None.

11. Lost Days/Time Impacts/Equipment Repairs:

12. Near Future Plans

- The MIP investigation will continue tomorrow, with a focus on the northern edge of the plume.
- Monitoring well installation is scheduled for May 19, with casing installation for the deep well scheduled for May 20, 2008.

On behalf of Conti Environmental, Inc. and its' subcontractors, I certify that this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as noted.

Tony Swierczek/18May08

Field Team Leader, CH2M HILL / Date

DAILY QUALITY CONTROL REPORT

Daily Report No: 016

Date: 05/19/08

Weather: Partly cloudy

Precip.: Trace

°F Temp: Min: 54 Max 78

1. Personnel and Area(s) of Responsibility:

# of Personnel	Trade/Title	Hours (each)	Employer	Location/Work Description
1	Field Team Leader	11	CH2M HILL	MIP investigation near former Building 220
1	Field Team Member	10	CH2M HILL	Monitoring well installation
1	Field Team Member	8	CH2M HILL	Monitoring well installation
3	MIP Subcontractor	9	Precision Sampling	MIP Investigation near former Building 220
2	Driller Subcontractor	10	MRK Environmental Exploration	Monitoring well installation

2. Equipment Used:

Equipment Description	Qty.	Date of Arrival	Date of Safety Check
Geoprobe 6625 DPT rig	1	05/14/08	05/19/08
Mobile lab vehicle	1	05/14/08	05/19/08
CME 45 Drill rig	1	05/16/08	05/19/08

3. Work Performed Today:

MIP Investigation

CH2M HILL staff continued the MIP investigation in the vicinity of former Building 220. The MIP investigation focused on the northern edge of the plume, along Stratford Avenue. The initial boring (MIP-20) was advanced northeast of MIP-05 to delineate high-level impact (max ECD response) observed at the MIP-05 location. Maximum ECD response was observed at this location, with MIP refusal at 23.91' bgs. The next MIP boring (MIP-21) was advanced approximately 35 feet east of MIP-20 and north of MIP-17. Medium-level impact (1.25 E6 uV) was observed at this location, with MIP refusal at 22.98' bgs. An additional boring could not be positioned further east of MIP-21 due to buried utilities and the proximity to the intersection of a major thoroughfare. MIP-22 was advanced approximately 50 feet west of MIP-20 to delineate high-level impact observed at MIP-05 to the southeast (MIP-05) and to the east (MIP-20), as well as low-level impact observed to the south (MIP-19). An ECD response of 4.2 E5 uV was observed at 3-3.5' bgs; baseline responses were observed to MIP refusal at 15.97' bgs. MIP-23 was advanced on the north side of Stratford Avenue, near 6317 Stratford Avenue. No impact was observed at this location, with MIP refusal at 26' bgs. The property owner at 6321 Stratford Avenue was contacted regarding advancement of a MIP boring on his property. The access was denied, as it had rained heavily last week and the DPT track rig would likely damage his lawn. It was discussed between CH2M HILL and the MIP field crew if it would be feasible to advance a MIP boring south of the initial onsite boring (MIP-01). Overhead telephone and electric prevented the advancement of a boring. It was also discussed if it would be feasible to locate a MIP boring east of MIP-17, where an ECD response of 3.5 E5 uV was observed. The steep incline of the slope will be too great to level the DPT rig. The MIP investigation was concluded today.

Please note, CPT refusal is 3 feet deeper than MIP refusal, as the CPT tool is positioned beneath the MIP sensor. All borings were abandoned with hydrated bentonite chips from the bottom of the boring to ground surface.

Shallow Monitoring Well Installation

Drilling subcontractors were onsite to install one shallow monitoring well (MW-115) south of the initial MIP boring (MIP-01) on the south side of the fence. The boring was advanced to weathered shale at 44.4' bgs and logged per the USCS. The boring was backfilled with sand from 44.4-43' bgs. A 2" PVC monitoring well equipped with a 10-foot, 10 slot screen was installed as an above ground monitoring well from 42' bgs (the perceived bedrock surface) to approximately 3 feet above ground surface. The well was completed above grade due to thick vegetation. The annular space was completed with sand filter pack from 43-31' bgs, a hydrated bentonite plug from 31-29' bgs (allowed to set for one hour), and a high-solids sodium bentonite slurry from 29' bgs to ground surface. A 4' x 4' concrete pad was constructed following monitoring well installation. The well will be developed by the driller subcontractor no less than 24 hours after well completion. The surface completion for the monitoring well installed on May 16 (MW-116) was finished with concrete around the well protector. A concrete pad was not needed, as the well was installed in the alley (concrete surface) near 6317 Stratford Avenue.

Three drums of soil IDW was generated during soil boring activities related to monitoring well MW-115 installation. Decontamination water was containerized in a 55-gallon drum.

4. Results of Control Activities:

Not applicable

St. Louis Ordnance Plant, Former Hanley Area

Remedial Investigation

St. Louis, Missouri

**5. Tests Performed as Required by Plans and/or Specifications:**

Soil cores generated during soil boring activities were field screened with a MultiRAE equipped with a 10.7 eV lamp for VOC detection.

6. Materials Received:

Description	Quantity	No. of Trucks	Compliant with Specs?
Not applicable			

7. Submittals Reviewed and Approved:

Submittal Number(s)	Applicable Specification Plan Section	Approved By	Action
Not applicable			

8. Verbal Instructions Given/Controversial Matters:

The PM was notified that the thick vegetation near MW-115 would likely make it difficult to locate the well during future groundwater monitoring activities, if it were to be completed as a flush-mount. It was agreed that monitoring well MW-115 would be completed as an above-ground well. In addition, permission was granted by the PM to set the well protector at MW-116 with concrete in the annular space between the protector and the soil. A concrete pad was not necessary because the well is set in a concreted area.

9. Job Safety: (Report violations; corrective instructions given; corrective action taken)

A site safety meeting was held onsite. The placement of the mobile lab vehicle and DPT rig was the highlight of the tailgate meeting with Precision. Stratford Avenue is a relatively busy thoroughfare, therefore significant effort was made to position the vehicle and rig in a way that would not restrict traffic flow while maintaining personnel safety. Traffic delineators were used to create an exclusion zone on the traffic side and caution tape was used to separate the work area from pedestrians. Reviewed the site security plan with Precision and MRK. Potential hazards, PPE, emergency contacts, hospital route, and BBLPS procedures were discussed. A PTSP was reviewed and signed by all onsite field staff and subcontractors. No safety violations were observed.

10. Remarks:

None.

11. Lost Days/Time Impacts/Equipment Repairs:

None.

St. Louis Ordnance Plant, Former Hanley Area

Remedial Investigation

St. Louis, Missouri



12. Near Future Plans

- Soil and groundwater confirmation sampling will begin on May 21, 2008
- Installation of the 6" steel casing is tentatively scheduled for Tuesday, May 27, 2008

On behalf of Conti Environmental, Inc. and its' subcontractors, I certify that this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as noted.

Tony Swierczek/19May08

Field Team Leader, CH2M HILL / Date

DAILY QUALITY CONTROL REPORT

Daily Report No: 017

Date: 05/21/08

Weather: Clear

Precip.: None

°F Temp: Min: 60 Max 80

1. Personnel and Area(s) of Responsibility:

# of Personnel	Trade/Title	Hours (each)	Employer	Location/Work Description
1	Field Team Leader	10	CH2M HILL	Soil and groundwater confirmation sampling
1	Field Team Member	9	CH2M HILL	Soil and groundwater confirmation sampling
1	QC Officer	8	CH2M HILL	Quality control oversight during confirmation sampling
1	Oversight/Geologist	8	USACE	USACE oversight during confirmation sampling
2	Driller Subcontractor	9	MRK Environmental Exploration	Soil and groundwater confirmation sampling

2. Equipment Used:

Equipment Description	Qty.	Date of Arrival	Date of Safety Check
CME 550 ATV drill rig	1	05/21/08	05/21/08

3. Work Performed Today:

Soil Confirmation Sampling

CH2M HILL staff began soil and groundwater confirmation sampling activities as part of the MIP investigation near the former Building 220 area. The initial soil confirmation boring (CB-01) was advanced near MIP-01 to address the high-level impact observed during the MIP investigation. One soil sample was collected for VOC analysis at 30-30.5 feet bgs, within the interval that exhibited the highest ECD response. In addition, soil was collected from 30-32' bgs for natural oxidant demand (NOD). The boring was terminated at 34 feet bgs. Following soil sample collection at CB-01, a 1" PVC temporary piezometer was installed at the bottom of the boring. The temporary piezometer is equipped with a 5-foot prepacked screen. The annular space was completed with sand filter pack from the bottom of the boring to 2 feet above the screen overlain by a 4-foot thick hydrated bentonite seal to prevent vertical migration of groundwater from above. The amount of water within the temporary piezometer was gauged throughout the day. Approximately 0.50 feet of water was present in the piezometer. The piezometer will be purged tomorrow to reduce the risk of collecting potable water used during hydration of the bentonite seal. Once 5 gallons (the amount of potable water used to hydrate the bentonite) has been purged, a grab groundwater sample will be collected. If the piezometer purges dry prior to recovery of 5 gallons, the piezometer will be allowed to recharge and a groundwater sample collected.

Soil boring CB-02 was advanced approximately 25 feet south and 18 feet west of CB-01 and MIP-01 to address potential offsite sources of cVOC contamination. The termination depth and soil sample interval at CB-02 mimicked the termination depth and soil sample interval collected at CB-01. One soil sample was collected for VOC analysis at 30-30.5 feet bgs. Following soil sample collection at CB-02, a 1" PVC temporary piezometer was installed at the bottom of the boring. The temporary piezometer is equipped with a 5-foot prepacked screen. The annular space was completed with sand filter pack from the bottom of the boring to 2 feet above the screen overlain by a 4-foot thick layer of bentonite chips. The bentonite was not hydrated, as groundwater was observed above the bentonite seal. Approximately 0.60 feet of water was present in the piezometer. A grab groundwater sample will be collected from CB-02 tomorrow. If the piezometer purges dry prior to collection of all groundwater sample bottles, the piezometer will be allowed to recharge and the remaining volume collected.

Soil samples were shipped to each respective laboratory under chain-of-custody via FedEx priority overnight.

Two drums of soil IDW was generated at CB-01 and 3 drums of soil IDW was generated at CB-02.

4. Results of Control Activities:

Not applicable

5. Tests Performed as Required by Plans and/or Specifications:

Soil cores were logged in accordance with USCS and field screened with a MultiRAE equipped with a 10.7 eV lamp for VOC detection.

6. Materials Received:

Description	Quantity	No. of Trucks	Compliant with Specs?
Not applicable			

7. Submittals Reviewed and Approved:

Submittal Number(s)	Applicable Specification/Plan Section	Approved By	Action
Not applicable			

8. Verbal Instructions Given/Controversial Matters:

The scope of work as detailed in the Work Plan proposed collection of soil and groundwater confirmation samples using DPT methods. However, hollow stem augers equipped with a 4" I.D. continuous sampling tube system was used to advance the soil borings. Temporary piezometers were installed within the augers due to potential borehole collapse caused by the tight expansive clays. In addition, the field staff was instructed by the Task Manager to hydrate the bentonite seal during temporary piezometer installation activities if groundwater is not present at the depth of seal placement. However, it was suggested by the QC Officer to place a layer of high solids bentonite slurry above the bentonite seal. In this case, the bentonite seal will not be hydrated. The bentonite slurry will act as the primary seal to prevent vertical migration of groundwater from above.

9. Job Safety: (Report violations; corrective instructions given; corrective action taken)

A site safety meeting was held onsite. A Pre-Task Safety Plan was reviewed and signed. The Health & Safety Plan, Site Security Plan, and BBLPS were reviewed with the field staff and driller subcontractor. Potential hazards, PPE, emergency contacts, and the hospital route were discussed. No safety violations were observed.

10. Remarks:

None.

11. Lost Days/Time Impacts/Equipment Repairs:

None.

12. Near Future Plans

- Soil and groundwater confirmation sampling will resume on May 22, 2008
- Installation of the 6" steel casing for the deep well is tentatively scheduled for Tuesday, May 27, 2008

On behalf of Conti Environmental, Inc. and its' subcontractors, I certify that this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as noted.

Tony Swierczek/21May08

Field Team Leader, CH2M HILL / Date

DAILY QUALITY CONTROL REPORT

Daily Report No: 018

Date: 05/22/08

Weather: Rainstorms

Precip.: Yes

°F Temp: Min: 52 Max 63

1. Personnel and Area(s) of Responsibility:

# of Personnel	Trade Title	Hours (each)	Employer	Location/Work Description
1	Field Team Leader	9	CH2M HILL	Soil and groundwater confirmation sampling
1	Field Team Member	8	CH2M HILL	Soil and groundwater confirmation sampling
1	Oversight/ Geologist	3	USACE	USACE oversight during confirmation sampling
2	Driller Subcontractor	8	MRK Environmental Exploration	Soil and groundwater confirmation sampling

2. Equipment Used:

Equipment Description	Qty.	Date of Arrival	Date of Safety Check
CME 550 ATV drill rig	1	05/21/08	05/22/08

3. Work Performed Today:

Soil Confirmation Sampling

CH2M HILL staff resumed soil and groundwater confirmation sampling activities as part of the MIP investigation near the former Building 220 area. Soil was classified using the USCS during logging activities. Soil borings at which a temporary piezometer was not installed was abandoned with bentonite chips from the bottom of the boring to ground surface.

Soil confirmation boring (CB-03) was advanced near MIP-14 to address the low-level impact observed at this location during the MIP investigation. One soil sample was collected for VOC analysis at 8-10 feet bgs, within the interval that exhibited the highest ECD response. The boring was terminated at 10 feet bgs and abandoned.

Confirmation soil boring CB-04 was centered between MIP borings MIP-12, MIP-13, and MIP-16. One soil sample was collected at 9-10 feet bgs, within the interval that corresponds with the peak ECD response at MIP-12 (as the elevations at MIP-12 and CB-04 are similar). The soil boring was terminated at 30 feet bgs. Following soil sample collection at CB-04 for VOC analysis, a 1" PVC temporary piezometer was installed at the bottom of the boring. The temporary piezometer is equipped with a 5-foot prepacked screen. The annular space was completed with sand filter pack from the bottom of the boring to 2 feet above the screen overlain by a 4-foot thick layer of bentonite chips. The bentonite was not hydrated, as groundwater was observed above the bentonite seal, using a water level indicator. The temporary piezometer will be gauged upon arrival to the site tomorrow and a grab groundwater sample will be collected. If the piezometer purges dry prior to collection of all groundwater sample bottles, the piezometer will be allowed to recharge and the remaining volume collected.

The temporary piezometer at CB-01 was gauged and purged (using a peristaltic pump and dedicated tubing) because potable water was used to hydrate the bentonite seal during installation. Approximately 150 mL was removed from the piezometer before purging dry. The piezometer was allowed to recharge prior to collection of a groundwater sample for VOC analysis. Water quality parameters DO, ORP, Specific Conductivity, and pH were collected following sample collection.

The temporary piezometer at CB-02 was gauged and sampled using a peristaltic pump and dedicated tubing. Water quality parameters DO, ORP, Specific Conductivity, and pH were collected following sample collection.

Soil and groundwater samples were shipped to PEL under chain-of-custody via FedEx priority overnight.

One drum of soil IDW was generated at CB-03 and 2 drums of soil IDW was generated at CB-04.

4. Results of Control Activities:

Not applicable

5. Tests Performed as Required by Plans and/or Specifications:

Soil cores were logged in accordance with USCS and field screened with a MultiRAE equipped with a 10.7 eV lamp for VOC detection. Water quality parameters were recorded using a YSI 650 MDS following groundwater sample collection.

6. Materials Received:

Description	Quantity	No. of Trucks	Compliant with Specs?
Not applicable			

7. Submittals Reviewed and Approved:

Submittal Number(s)	Applicable Specification/Plan Section	Approved By	Action
Not applicable			

8. Verbal Instructions Given/Controversial Matters:

It was originally planned to collect soil and groundwater samples near the north fence at the site. However, due to high voltage power lines within 10 feet of the confirmation locations, the locations were modified to maintain a safe distance from the overhead electric. Additionally, James Lyons (USACE) provided comments to the FTL prior to his departure. He recommends having the drillers wear Tyvek suits when removing the augers from locations where high-level impact was observed during the MIP investigation. Also, the size of the decontamination pad will be increased. James noted some overspray during decontamination activities.

9. Job Safety: (Report violations; corrective instructions given; corrective action taken)

A site safety meeting was held onsite. A Pre-Task Safety Plan was reviewed and signed. The Health & Safety Plan, Site Security Plan, and BBLPS were reviewed with the field staff and driller subcontractor. Potential hazards, PPE, emergency contacts, and the hospital route were discussed. No safety violations were observed.

10. Remarks:

None.

11. Lost Days/Time Impacts/Equipment Repairs:

None.

12. Near Future Plans

- Soil and groundwater confirmation sampling will resume on May 23, 2008
- Installation of the 6" steel casing for the deep well is scheduled for Wednesday morning May 28, 2008

On behalf of Conti Environmental, Inc. and its' subcontractors, I certify that this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as noted.

Tony Swierczek/22May08

Field Team Leader, CH2M HILL / Date

DAILY QUALITY CONTROL REPORT

Daily Report No: 019

Date: 05/23/08

Weather: Clear and sunny

Precip.: None

°F Temp: Min: 58 Max 80

1. Personnel and Area(s) of Responsibility:

# of Personnel	Trade/Title	Hours (each)	Employer	Location/Work Description
1	Field Team Leader	9	CH2M HILL	Soil and groundwater confirmation sampling
1	Field Team Member	8	CH2M HILL	Soil and groundwater confirmation sampling
2	Drilling Subcontractor	8	MRK Environmental	Soil and groundwater confirmation sampling
1	EPA oversight	3	Chamberlain Group	Oversight on behalf of PEE and EPA

2. Equipment Used:

Equipment Description	Qty.	Date of Arrival	Date of Safety Check
CME 550			

3. Work Performed Today:

Soil and Groundwater Confirmation Sampling

CH2M HILL staff was onsite to continue soil and groundwater confirmation sampling activities near former Building 220. Soil boring CB-06 was advanced between MIP-18 and the northeast corner of the concrete pad to 23' bgs. One soil sample and 2 geotechnical samples were collected at CB-06 for VOC analysis. Following soil sample collection, a 1" PVC temporary piezometer was installed at termination depth. One groundwater sample was collected from the piezometer. A soil boring (CB-05) was advanced to 25' bgs near MIP-03 (source) and soil samples collected for NOD analysis from 4 to 13' bgs and 13 to 21' bgs..

One groundwater sample was collected at CB-04, which was installed on May 22.

Soil borings at which a temporary piezometer was not installed were abandoned with medium bentonite chips from the bottom of the boring to ground surface.

4. Results of Control Activities:

Not applicable

5. Tests Performed as Required by Plans and/or Specifications:

Not applicable

6. Materials Received:

Description	Quantity	No. of Trucks	Compliant with Specs?
Not applicable			

7. Submittals Reviewed and Approved:

Submittal Number(s)	Applicable Specification/Plan Section	Approved By	Action
Not applicable			

8. Verbal Instructions Given/Controversial Matters:

None.

9. Job Safety: (Report violations; corrective instructions given; corrective action taken)

A site safety meeting was held on site. A Pre-task Safety Plan, SWO form, and Drilling Assessment Checklist were completed. No safety violations were observed.

10. Remarks:

None.

11. Lost Days/Time Impacts/Equipment Repairs:

None.

12. Near Future Plans

- One soil boring will be advanced near MIP-03 and CB-05 for collection of 2 geotechnical samples. The boring will also be used to log soil from 25' bgs to 5 feet within competent bedrock. A borehole, CB-07 (near MIP-22), will be advanced to collect a shallow soil sample.
- Indoor air sampling is scheduled for May 28 at 6317 Stratford Avenue.
- Shallow monitoring well development is scheduled for May 27, 2008.
- Deep monitoring well installation is scheduled for May 30, with casing installation for the deep well scheduled for May 28, 2008.

On behalf of Conti Environmental, Inc. and its' subcontractors, I certify that this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as noted.

Tony Swierczek/23May08

Field Team Leader, CH2M HILL / Date

DAILY QUALITY CONTROL REPORT

Daily Report No: 020

Date: 05/27/08

Weather: Cloudy and rain

Precip.: T-storms

°F Temp: Min: 58 Max 80

1. Personnel and Area(s) of Responsibility:

# of Personnel	Trade/Title	Hours (each)	Employer	Location/Work Description
1	Field Team Leader	9	CH2M HILL	Soil and groundwater confirmation sampling
1	Field Team Member	9	CH2M HILL	Soil and groundwater confirmation sampling
2	Drilling Subcontractor	4	MRK Environmental	Soil and groundwater confirmation sampling
1	Project Manager	2	CH2M HILL	Oversight of deep well boring

2. Equipment Used:

Equipment Description	Qty.	Date of Arrival	Date of Safety Check
CME 550	1	5/19/2008	5/27/2008
Support truck	1	5/19/2008	5/27/2008
Skid steer	1	5/27/2008	5/27/2008

3. Work Performed Today:

Soil and Groundwater Confirmation Sampling

CH2M HILL staff was onsite to advance the boring for deep monitoring well MW-117 and collect NOD groundwater samples near former Building 220. Soil boring CB-05 was advanced 3 feet east of the confirmation sample boring CB -05 to 45' bgs. Two Shelby tube geotechnical samples were collected at CB-05 for grain size, hydrometer and wet prep, and permeability analysis. The Shelby tubes were collected from 12-14 feet bgs and 17-19 feet bgs. One groundwater sample was collected from MW-111 for NOD analysis including total iron, VOC, TOC and alkalinity.

4. Results of Control Activities:

Not applicable

5. Tests Performed as Required by Plans and/or Specifications:

Not applicable

6. Materials Received:

Description	Quantity	No. of Trucks	Compliant with Specs?
Not applicable			

7. Submittals Reviewed and Approved:

Submittal Number(s)	Applicable Specification/Plan Section	Approved By	Action
Not applicable			

8. Verbal Instructions Given/Controversial Matters:

None.

9. Job Safety: (Report violations; corrective instructions given; corrective action taken)

A site safety meeting was held on site. A Pre-task Safety Plan was completed. No safety violations were observed.

10. Remarks:

None.

11. Lost Days/Time Impacts/Equipment Repairs:

None.

12. Near Future Plans

- Indoor air sampling is scheduled for May 28 at 6317 Stratford Avenue.
- Shallow monitoring well development is scheduled for May 27, 2008.
- Deep monitoring well installation is scheduled for May 30, with casing installation for the deep well scheduled for May 28, 2008.

On behalf of Conti Environmental, Inc. and its' subcontractors, I certify that this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as noted.

Glynn Roberts/27May08

Field Team Leader, CH2M HILL / Date

DAILY QUALITY CONTROL REPORT

Daily Report No: 021

Date: 05/28/08

Weather: Sunny

Precip.: None

°F Temp: Min: 58 Max 77

1. Personnel and Area(s) of Responsibility:

# of Personnel	Trade Title	Hours (each)	Employer	Location/Work Description
1	Field Team Leader	10	CH2M HILL	Soil and groundwater confirmation sampling
1	Field Team Member	10	CH2M HILL	Soil and groundwater confirmation sampling
2	Drilling Subcontractor	10	MRK Environmental	Soil and groundwater confirmation sampling
1	Project Manager	4	CH2M HILL	Oversight of deep well boring and indoor air sampling
1	Project Manager	4	USACE	Oversight of deep well boring and indoor air sampling
1	Consultant	5	EPA Oversight	Oversight of deep well boring and indoor air sampling

2. Equipment Used:

Equipment Description	Qty.	Date of Arrival	Date of Safety Check
CME 550	1	5/19/2008	5/27/2008
Support truck	1	5/19/2008	5/27/2008
Skid steer	1	5/27/2008	5/27/2008

3. Work Performed Today:

Indoor and Ambient Air Sampling

Three air sample summa canisters were placed in the basement at 6317 Stratford. One canister was placed in the northeast corner and two were placed in the southwest corner which included a field duplicate. The remaining canister was placed under the rear patio in the stairwell to the basement to sample ambient air.

The flow rates were preset from the lab at 3.5 ml/min so that a sample would be collected over a 24 hour period.

MW-117 Installation

CH2M HILL staff was onsite to advance the boring for deep monitoring well MW-117 and collect NOD groundwater samples near former Building 220. Soil boring MW-117 was advanced 2 feet west of the MIP location MIP-03 to 44' bgs. A small amount of cement grout was then placed in the boring and the steel 6 inch casing was installed through the 8.25 inch augers and into the grout. The augers were then removed and the casing grouted into place.

NOD Groundwater Sampling

The remaining volume for the NOD groundwater sample was collected from MW-111.

4. Results of Control Activities:

Not applicable

5. Tests Performed as Required by Plans and/or Specifications:

Not applicable

6. Materials Received:

Description	Quantity	No. of Trucks	Compliant with Specs?
Not applicable			

7. Submittals Reviewed and Approved:

Submittal Number(s)	Applicable Specification/Plan Section	Approved By	Action
Not applicable			

8. Verbal Instructions Given/Controversial Matters:

None.

St. Louis Ordnance Plant, Former Hanley Area

Remedial Investigation

St. Louis, Missouri



9. Job Safety: (Report violations; corrective instructions given; corrective action taken)

A site safety meeting was held on site. A Pre-task Safety Plan was completed. No safety violations were observed.

10. Remarks:

None.

11. Lost Days/Time Impacts/Equipment Repairs:

None.

12. Near Future Plans

- Indoor air sampling canisters will be collected from 6317 Stratford Avenue on May 29th.
- Shallow monitoring well development is scheduled for May 29th.
- The remaining temporary piezometers are scheduled to be abandoned on May 29th.
- Well completion for MW-115 is scheduled to be installed on May 29th.
- Air rotary drilling for the deep monitoring well installation is scheduled for Saturday May 31st.

On behalf of Conti Environmental, Inc. and its' subcontractors, I certify that this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as noted.

Glynn Roberts/28May08

Field Team Leader, CH2M HILL / Date

DAILY QUALITY CONTROL REPORT

Daily Report No: 022

Date: 05/29/08

Weather: Clear and sunny

Precip.: No

°F Temp: Min: 58 Max 82

1. Personnel and Area(s) of Responsibility:

# of Personnel	Trade Title	Hours (each)	Employer	Location/Work Description
1	Field Team Leader	10	CH2M HILL	Monitoring well development, piezometer abandonment, deep well preparation
1	Field Team Member	9	CH2M HILL	Monitoring well development, piezometer abandonment, deep well preparation
2	Driller Subcontractor	9	MRK Environmental Exploration	Monitoring well development, piezometer abandonment, deep well preparation

2. Equipment Used:

Equipment Description	Qty.	Date of Arrival	Date of Safety Check
CME 550 ATV drill rig	1	05/21/08	05/29/08
Whale pump and surge block	1	05/21/08	05/29/08

3. Work Performed Today:

Shallow Monitoring Well Development

CH2M HILL staff provided oversight during the development of monitoring well MW-116. Prior to development, approximately 75 gallons of groundwater was calculated for the purge volume (5 well volumes). Water quality parameters were also recorded during well development. The monitoring well was developed by inserting a whale pump near the bottom of the well and removing an initial volume of 5 gallons of groundwater. A surge block constructed of decontaminated 1" PVC pipe and a slip cap was then moved throughout the entire length of the monitoring well screen to remove any fines from the sand filter pack. The whale pump was returned to the well and the process repeated. During development activities, the monitoring well went dry after approximately 17 gallons was recovered. The well was allowed to recharge until groundwater was observed above the pump. Development activities were concluded after the well purged dry a second time. Water quality readings stabilized within criteria during the final two readings. The groundwater was still turbid and brown following development. The development water was containerized and the drum properly labeled.

Deep Monitoring Well Activities

CH2M HILL and its subcontractor, MRK Environmental, checked the steel casing at deep monitoring well MW-117 for settling of grout that may have occurred. The grout surrounding the exterior of the steel casing settled approximately 6 feet bgs. Additional grout was used to bring it to just below ground surface. Approximately 20 feet of grout was observed within the casing. It was noted that 15 gallons of potable water was introduced in the casing during grouting activities on May 28, 2008. Water was used to keep the grout in place. Approximately 18 gallons of potable water was removed from the casing using a whale pump, with 1.3 feet remaining. The water level will be gauged tomorrow to ensure that a complete seal was achieved. The potable water was containerized and the drum properly labeled.

Temporary Piezometer Abandonment

Following the removal of the temporary piezometers at the 4 soil boring locations, each borehole was abandoned with hydrated bentonite chips.

Soil Confirmation Sampling

One soil confirmation sample was collected at 2-3 bgs near MIP-22 (along Stratford Avenue and near the western-most edge of the plume). A sample was collected at the shallow interval based on the response observed during the MIP investigation.

The soil sample was shipped to PEL under chain-of-custody via FedEx priority overnight.

4. Results of Control Activities:

Not applicable

5. Tests Performed as Required by Plans and/or Specifications:

Soil cores were logged in accordance with USCS and field screened with a MultiRAE equipped with a 10.7 eV lamp for VOC detection. Water quality parameters were recorded using an YSI 650 MDS and Hach Turbidimeter during monitoring well development.

6. Materials Received:

Description	Quantity	No. of Trucks	Compliant with Specs?
Not applicable			

7. Submittals Reviewed and Approved:

Submittal Number(s)	Applicable Specification/Plan Section	Approved By	Action
Not applicable			

8. Verbal Instructions Given/Controversial Matters:

Dan Price instructed CH2M HILL staff to have MRK remove the potable water from the casing at deep monitoring well MW-117. This was to ensure that a complete seal was achieved during grouting activities.

9. Job Safety: (Report violations; corrective instructions given; corrective action taken)

A site safety meeting was held onsite. A Pre-Task Safety Plan was reviewed and signed. The Health & Safety Plan, Site Security Plan, and BBLPS were reviewed with the field staff and driller subcontractor. Potential hazards, PPE, emergency contacts, and the hospital route were discussed. No safety violations were observed.

10. Remarks:

None.

11. Lost Days/Time Impacts/Equipment Repairs:

None.

12. Near Future Plans

- Concrete pad and well protector installation at MW-115
- Monitoring well development at MW-115
- Gauging of MW-117

On behalf of Conti Environmental, Inc. and its' subcontractors, I certify that this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as noted.

Tony Swierczek/29May08

Field Team Leader, CH2M HILL / Date

DAILY QUALITY CONTROL REPORT

Daily Report No: 023

Date: 05/30/08

Weather: Clear and sunny

Precip.: None

°F Temp: Min: 72 Max 88

1. Personnel and Area(s) of Responsibility:

# of Personnel	Trade/Title	Hours (each)	Employer	Location/Work Description
1	Field Team Leader	8	CH2M HILL	Monitoring well development, concrete pad installation, deep well preparation
1	Field Team Member	8	CH2M HILL	Monitoring well development, concrete pad installation, deep well preparation
2	Driller Subcontractor	8	MRK Environmental Exploration	Monitoring well development, concrete pad installation, deep well preparation

2. Equipment Used:

Equipment Description	Qty.	Date of Arrival	Date of Safety Check
Whale pump and surge block	1	05/29/08	

3. Work Performed Today:

Shallow Monitoring Well Development

CH2M HILL staff provided oversight during the development of monitoring well MW-115. Prior to development, the required purge volume (5 well volumes) was calculated to be approximately 51 gallons of groundwater. Water quality parameters were also recorded during well development. A surge block constructed of decontaminated 1" PVC pipe and a slip cap was moved throughout the entire length of the monitoring well screen to remove any fines from the sand filter pack. A whale pump was inserted into the well and the surging process repeated two more times. During development activities, the monitoring well went dry after approximately 14 gallons was recovered. The well was allowed to recharge until groundwater was observed above the pump. Development activities were concluded after the well purged dry a second time. A total volume of 15 gallons was removed from MW-115. The groundwater was moderately turbid following development. The development water was containerized and the drum properly labeled.

Deep Monitoring Well Activities

CH2M HILL and its subcontractor, MRK Environmental, gauged the water in the steel casing at proposed deep monitoring well MW-117. During previous gauging of the steel casing (May 29), approximately 1.3 feet of water was observed. During today's gauging event, approximately 1.8 feet of water was observed. It was discussed with the driller why there was a slight increase in water in the casing. It was stated that potable water used to produce the grout (approximately 40 gallons) was being forced out of the grout during the curing process. Approximately 20 feet of grout exists in the casing, making it very unlikely that groundwater infiltration is occurring. The remaining water observed in the casing was pumped out and the casing gauged throughout the day. Two hours after pumping the casing dry, less than 1" of water was observed and then pumped. The casing was gauged a final time, with a trace amount of water observed. The casing will be checked on Monday, June 2 for the presence of water.

Concrete Pad Installation

Following well development at MW-115 a 4'x4'x4" concrete pad and well protector were installed. .

4. Results of Control Activities:

Not applicable

5. Tests Performed as Required by Plans and/or Specifications:

None.

6. Materials Received:

Description	Quantity	No. of Trucks	Compliant with Specs?
Not applicable			

7. Submittals Reviewed and Approved:

Submittal Number(s)	Applicable Specification/Plan Section	Approved By	Action
Not applicable			

St. Louis Ordnance Plant, Former Hanley Area

Remedial Investigation

St. Louis, Missouri



8. Verbal Instructions Given/Controversial Matters:

Dan Price instructed CH2M HILL staff to remove the remaining potable water from the casing at deep monitoring well MW-117. This was to ensure that a complete seal was achieved during grouting activities.

9. Job Safety: (Report violations; corrective instructions given; corrective action taken)

A site safety meeting was held onsite. A Pre-Task Safety Plan was reviewed and signed. The Health & Safety Plan, Site Security Plan, and BBLPS were reviewed with the field staff and driller subcontractor. Potential hazards, PPE, emergency contacts, and the hospital route were discussed. No safety violations were observed.

10. Remarks:

None.

11. Lost Days/Time Impacts/Equipment Repairs:

None.

12. Near Future Plans

- Groundwater sampling of 9 existing wells and 2 newly-installed shallow wells
- Deep monitoring well installation at MW-117 on June 7, 2008

On behalf of Conti Environmental, Inc. and its' subcontractors, I certify that this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as noted.

Tony Swierczek/30May08

Field Team Leader, CH2M HILL / Date

DAILY QUALITY CONTROL REPORT

Daily Report No: 024

Date: 06/02/08

Weather: Sunny

Precip.: None

°F Temp: Min: 75 Max 89

1. Personnel and Area(s) of Responsibility:

# of Personnel	Trade/Title	Hours (each)	Employer	Location/Work Description
1	Field Team Leader	8	CH2M HILL	Groundwater gauging and sampling
1	Field Team Member	8	CH2M HILL	Groundwater gauging and sampling
1	Chemist	3	USACE	Oversight groundwater sampling

2. Equipment Used:

Equipment Description	Qty.	Date of Arrival	Date of Safety Check
Water Level Indicator	1	05/29/08	

3. Work Performed Today:

MW-117 Installation

Water trapped in the casing was purged. Depth to water was initially 6.50 feet btoc. The casing was purged dry with approximately 30 gallons of water being removed. The depth to grout was measured at 23.8 feet btoc.

Groundwater Sampling

The water levels of the onsite and offsite well network were gauged. Prior to gauging the wells, the caps were removed so that the water levels could stabilize. A minimum of an hour was allowed for the water level stabilization prior to gauging. MW-107 had water in the completion above the casing. The water was purged prior to removing cap. MW-103 exhibited a lot of pressure when the cap was removed. After the removal of the cap, a strong odor of H₂S was noted.

4. Results of Control Activities:

Not applicable

5. Tests Performed as Required by Plans and/or Specifications:

None.

6. Materials Received:

Description	Quantity	No. of Trucks	Compliant with Specs?
Not applicable			

7. Submittals Reviewed and Approved:

Submittal Number(s)	Applicable Specification/Plan Section	Approved By	Action
Not applicable			

8. Verbal Instructions Given/Controversial Matters:

None.

9. Job Safety: (Report violations; corrective instructions given; corrective action taken)

A site safety meeting was held on site. A Pre-task Safety Plan was completed. No safety violations were observed.

10. Remarks:

None.

11. Lost Days/Time Impacts/Equipment Repairs:

None.

12. Near Future Plans

- Groundwater sampling of 9 existing wells and 2 newly-installed shallow wells
- Deep monitoring well installation at MW-117 on June 5, 2008

On behalf of Conti Environmental, Inc. and its' subcontractors, I certify that this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as noted.

Glynn Roberts/02June08

Field Team Leader, CH2M HILL / Date

DAILY QUALITY CONTROL REPORTDaily Report No: 025Date: 06/03/08Weather: Mostly sunnyPrecip.: None°F Temp: Min: 72 Max: 89**1. Personnel and Area(s) of Responsibility:**

# of Personnel	Trade Title	Hours (each)	Employer	Location/Work Description
1	Field Team Leader	9	CH2M HILL	Groundwater sampling
1	Field Team Member	9	CH2M HILL	Groundwater sampling
2	Drilling Subcontractor	3	MRK Environmental	Continued installation of MW-117
1	QC Oversight	4	CH2M HILL	Oversight of deep well boring and groundwater sampling
1	Chemist	9	USACE	Oversight groundwater sampling

2. Equipment Used:

Equipment Description	Qty.	Date of Arrival	Date of Safety Check
CME 550	1	6/03/2008	6/03/2008
Support truck	1	6/03/2008	6/03/2008

3. Work Performed Today:**MW-117 Installation**

CH2M HILL and MRK Environmental were onsite to grout the inside of the casing at MW-117 to surface to seal off any water leaking into the casing. The depth to water was measured and was noted to be at 19.18 btoc. The water was purged and a cement grout was tremied into the casing to surface.

Groundwater Sampling

Monitoring wells MW-111, MW-114 and MW-106 were purged and sampled. MW-111 was sampled for VOCs, dissolved gases, anions and dissolved metals. MW-114 and MW-116 were sampled for VOCs only. The wells were purged until the groundwater parameters had stabilized. Approximately 2.50 gallons of water was purged from MW-111. Approximately 1.2 gallons of water was purged from MW-114 and 3.5 gallons was removed from MW-106. All samples were immediately placed on ice and then shipped at the end of the day.

St. Louis Ordnance Plant, Former Hanley Area

Remedial Investigation

St. Louis, Missouri

**4. Results of Control Activities:**

Not applicable

5. Tests Performed as Required by Plans and/or Specifications:

Not applicable

6. Materials Received:

Description	Quantity	No. of Trucks	Compliant with Specs?
Not applicable			

7. Submittals Reviewed and Approved:

Submittal Number(s)	Applicable Specification/Plan Section	Approved By	Action
Not applicable			

8. Verbal Instructions Given/Controversial Matters:

None.

9. Job Safety: (Report violations; corrective instructions given; corrective action taken)

A site safety meeting was held on site. A Pre-task Safety Plan was completed. No safety violations were observed.

10. Remarks:

None.

11. Lost Days/Time Impacts/Equipment Repairs:

None.

12. Near Future Plans

- Groundwater sampling will continue on June 4th.
- Air rotary drilling of MW-117 to set the screen into bedrock through the surface casing is scheduled for June 5th.

On behalf of Conti Environmental, Inc. and its' subcontractors, I certify that this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as noted.

Glynn Roberts/03June08

Field Team Leader, CH2M HILL / Date

DAILY QUALITY CONTROL REPORT

Daily Report No: 026

Date: 06/03/08

Weather: Partly cloudy

Precip.: Trace

°F Temp: Min: 78 Max 92

1. Personnel and Area(s) of Responsibility:

# of Personnel	Trade Title	Hours (each)	Employer	Location/Work Description
1	Field Team Leader	9	CH2M HILL	Groundwater sampling
1	Field Team Member	9	CH2M HILL	Groundwater sampling
1	Oversight	2	Chamberlain Group	Oversight of groundwater sampling
1	Project Manager	2	USEPA	Oversight of groundwater sampling
1	Chemist	9	USACE	Oversight of groundwater sampling

2. Equipment Used:

Equipment Description	Qty.	Date of Arrival	Date of Safety Check

3. Work Performed Today:

Groundwater Sampling

Monitoring wells MW-108, MW-109, MW-113, and MW-116 were purged and sampled. All wells were sampled for VOCs. The wells were purged until the groundwater parameters had stabilized. Approximately 2.0 gallons of water was purged from MW-108. Approximately 1.0 gallon of water was purged from MW-109. Approximately 2.2 gallons was purged from MW-113 and 1.5 gallons was removed from MW-116. All samples, including samples collected on June 3, were immediately placed on ice and then shipped at the end of the day.

4. Results of Control Activities:

Not applicable

5. Tests Performed as Required by Plans and/or Specifications:

Not applicable

6. Materials Received:

Description	Quantity	No. of Trucks	Compliant with Specs?
Not applicable			

7. Submittals Reviewed and Approved:

Submittal Number(s)	Applicable Specification/Plan Section	Approved By	Action
Not applicable			

8. Verbal Instructions Given/Controversial Matters:

Groundwater samples collected at MW-111 were not submitted for laboratory analyses. Sample bottles used to collect MNA analyses appeared to be leaking preservative, therefore the sample bottles used at MW-111 were called into question. New sample bottles have been ordered and MW-111 will be resampled.

9. Job Safety: (Report violations; corrective instructions given; corrective action taken)

A site safety meeting was held on site. A Pre-task Safety Plan was completed. No safety violations were observed.

10. Remarks:

None.

11. Lost Days/Time Impacts/Equipment Repairs:

None.

12. Near Future Plans

- Groundwater sampling will continue on June 5th.
- Air rotary drilling of MW-117 to set the screen into bedrock through the surface casing is scheduled for June 5th.

On behalf of Conti Environmental, Inc. and its' subcontractors, I certify that this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as noted.

Tony Swierczek/04June08

Field Team Leader, CH2M HILL / Date

DAILY QUALITY CONTROL REPORT

Daily Report No: 027

Date: 06/05/08

Weather: Partly cloudy

Precip.: None

°F Temp: Min: 78 Max 92

1. Personnel and Area(s) of Responsibility:

# of Personnel	Trade/Title	Hours (each)	Employer	Location/Work Description
1	Field Team Leader	12	CH2M HILL	Groundwater sampling
1	Field Team Member	11	CH2M HILL	Oversight of deep well installation
1	Project Manager	2	USEPA	Oversight of groundwater sampling

2. Equipment Used:

Equipment Description	Qty.	Date of Arrival	Date of Safety Check
CME 550 drill rig	1	06/05/08	06/05/08
Air compressor	1	06/05/08	06/05/08

3. Work Performed Today:

Groundwater Sampling

Monitoring wells MW-107, MW-110, MW-112, and MW-115 were purged and sampled. Monitoring well MW-112 was sampled for VOCs and the remaining wells sampled for VOCs, dissolved metals (Fe, Mn), dissolved gases (methane, ethane, ethane), and anions (sulfate, nitrate, chloride). The wells were purged until the groundwater parameters had stabilized. Approximately 1.0 gallon of water was purged from MW-107. Approximately 1.2 gallons of water was purged from MW-110 and MW-112. Approximately 1.5 gallons was purged from MW-115. All samples were immediately placed on ice and then shipped at the end of the day.

Deep Monitoring Well Installation

CH2M HILL staff were onsite to oversee the installation of deep monitoring well MW-117. Air rotary drilling methods were used to advance the boring to a termination depth of 54 feet bgs. The drilling rods were initially advanced to 18 feet bgs and retracted to observe any groundwater infiltration into the steel casing. No water was observed. The borehole was then advanced within 1 foot of the bottom of the steel casing (43 feet bgs) and allowed to sit for a period of one hour to see if any accumulation of groundwater occurred in the casing. None was observed. After the borehole was advanced to the bottom of the casing, the drill rods were retracted and a minimal amount of water was observed. The borehole dried up as air rotary activities continued. The borehole was terminated at a depth of 54 feet bgs. Approximately 2 feet of water was observed at the bottom of the boring. As the drill rods were retracted, the remaining grout inside the steel casing collapsed at approximately 34 feet bgs. Water was added to clear the obstruction. Following reaming of the borehole, no water was observed. A 2" PVC monitoring well consisting of a 5 foot screen and 49 feet of casing was installed at the termination depth. Sand filter pack was placed from the bottom of the boring to 4 feet above the screen. High solids bentonite grout was tremied from the top of the sand filter pack to ground surface. The surface completion consists of a 4' x 4' concrete pad and flush mount well protector. The monitoring well will be gauged during groundwater sampling activities on June 6, 2008.

4. Results of Control Activities:

Not applicable

5. Tests Performed as Required by Plans and/or Specifications:

Not applicable

6. Materials Received:

Description	Quantity	No. of Trucks	Compliant with Specs?
Not applicable			

7. Submittals Reviewed and Approved:

Submittal Number(s)	Applicable Specification Plan Section	Approved By	Action
Not applicable			

8. Verbal Instructions Given/Controversial Matters:

None.

9. Job Safety: (Report violations; corrective instructions given; corrective action taken)

A site safety meeting was held on site. A Pre-task Safety Plan was completed. Heat-related issues were discussed. A drilling self-assessment checklist and Safe Work Observation form were completed. No safety violations were observed.

10. Remarks:

None.

11. Lost Days/Time Impacts/Equipment Repairs:

None.

12. Near Future Plans

- Groundwater sampling will continue on June 6th.
- Monitoring well MW-117 will be gauged, developed and sampled.

On behalf of Conti Environmental, Inc. and its' subcontractors, I certify that this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as noted.

Tony Swierczek/05June08

Field Team Leader, CH2M HILL / Date

DAILY QUALITY CONTROL REPORT

Daily Report No: 028

Date: 06/06/08

Weather: Partly cloudy

Precip.: None

°F Temp: Min: 83 Max 92

1. Personnel and Area(s) of Responsibility:

# of Personnel	Trade/Title	Hours (each)	Employer	Location/Work Description
1	Field Team Leader	6	CH2M HILL	Groundwater sampling and gauging of deep well
1	Field Team Member	6	CH2M HILL	Groundwater sampling and gauging of deep well

2. Equipment Used:

Equipment Description	Qty.	Date of Arrival	Date of Safety Check

3. Work Performed Today:

Groundwater Sampling

Monitoring well MW-111 was re-sampled, as laboratory bottles containing preservatives appeared to be leaking prior to use on 06/04/08. Monitoring well MW-111 was purged, sampled, and submitted for laboratory analysis of VOCs, dissolved metals (Fe, Mn), dissolved gases (methane, ethane, ethane), and anions (sulfate, nitrate, chloride). The well was purged until the groundwater parameters had stabilized. It was noted that elevated DO concentrations were observed during low-flow activities over those seen during the initial sampling. Elevated DO readings may be a result of air rotary activities at the newly installed deep monitoring well MW-117 located immediately adjacent to well MW-111. Approximately 1.5 gallons of water was purged from MW-111. The samples were immediately placed on ice and then shipped to the analytical laboratory at the end of the day.

Deep Monitoring Well Gauging

CH2M HILL staff were onsite to gauge the water level at deep monitoring well MW-117. Depth to water was recorded at 15.98 feet bgs, with a total depth of 54.20 feet bgs. The well will be developed on June 9, 2008.

4. Results of Control Activities:

Not applicable

5. Tests Performed as Required by Plans and/or Specifications:

Not applicable

6. Materials Received:

Description	Quantity	No. of Trucks	Compliant with Specs?
Not applicable			

7. Submittals Reviewed and Approved:

Submittal Number(s)	Applicable Specification/Plan Section	Approved By	Action
Not applicable			

8. Verbal Instructions Given/Controversial Matters:

None.

9. Job Safety: (Report violations; corrective instructions given; corrective action taken)

A site safety meeting was held on site. A Pre-task Safety Plan was completed. Heat-related issues were discussed.
No safety violations were observed.

10. Remarks:

None.

11. Lost Days/Time Impacts/Equipment Repairs:

None.

12. Near Future Plans

- Gauging, well development, and sampling at MW-117.
- IDW handling and disposal.
- Surveying of all MIP, surface soil, and confirmation sample locations.

On behalf of Conti Environmental, Inc. and its' subcontractors, I certify that this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as noted.

Tony Swierczek/06June08

Field Team Leader, CH2M HILL / Date

DAILY QUALITY CONTROL REPORT

Daily Report No: 029

Date: 06/09/08

Weather: Clear and partly cloudy **Precip.:** None **°F Temp:** **Min:** 78 **Max** 91

1. Personnel and Area(s) of Responsibility:

# of Personnel	Trade/Title	Hours (each)	Employer	Location/Work Description
1	Field Team Leader	7	CH2M HILL	Deep monitoring well development, check water quality at MW-115, site clean-up
1	Field Team Member	4	CH2M HILL	Deep monitoring well development, check water quality at MW-115, site clean-up
1	Oversight	1	Chamberlain Group	Oversight of deep monitoring well development

2. Equipment Used:

Equipment Description	Qty.	Date of Arrival	Date of Safety Check
Mini-monsoon pump and surge block	1	06/09/08	

3. Work Performed Today:

Deep Monitoring Well Development

CH2M HILL staff developed monitoring well MW-117. Prior to development, the required purge volume (5 well volumes) was calculated to be approximately 70 gallons of groundwater. Water quality parameters were also recorded during well development. The monitoring well screen was surged prior to insertion of the mini-monsoon pump. The pump was inserted into the well and the surging process repeated two more times. During development activities, the monitoring well was surged after approximately 7 gallons was recovered. The well went dry after approximately 12 gallons was removed. The well was allowed to recharge until groundwater was observed above the pump. Development activities were concluded after the well purged dry a second time. A total volume of 13 gallons was removed from MW-117. The groundwater was turbid following development. The development water was containerized and the drum properly labeled.

Monitoring Well MW-115

CH2M HILL mobilized to newly-installed shallow monitoring well MW-115 to check the pH. It was noted during well development and groundwater sampling at MW-115 that elevated pH readings were observed. Disposable tubing and a peristaltic pump was used to recover a small amount of groundwater from the midpoint of the screened interval. The pH was observed at 11.55. The groundwater within the monitoring well will be purged and the water quality checked following recharge on June 12, 2008.

4. Results of Control Activities:

Not applicable

5. Tests Performed as Required by Plans and/or Specifications:

None.

6. Materials Received:

Description	Quantity	No. of Trucks	Compliant with Specs?
Not applicable			

7. Submittals Reviewed and Approved:

Submittal Number(s)	Applicable Specification Plan Section	Approved By	Action
Not applicable			

8. Verbal Instructions Given/Controversial Matters:

It was discussed with Dan Price to purge monitoring well MW-115 on June 12, 2008, based on observations noted at this well.

9. Job Safety: (Report violations; corrective instructions given; corrective action taken)

A site safety meeting was held onsite. A Pre-Task Safety Plan was reviewed and signed. The Health & Safety Plan, Site Security Plan, and BBLPS were reviewed with the field staff. A Safe Work Observation Form was completed. Potential hazards, PPE, emergency contacts, and the hospital route were discussed. No safety violations were observed.

10. Remarks:

None.

11. Lost Days/Time Impacts/Equipment Repairs:

None.

12. Near Future Plans

- Groundwater sampling of monitoring well MW-117 on June 12, 2008
- Oversight of surveying activities on June 12, 2008

On behalf of Conti Environmental, Inc. and its' subcontractors, I certify that this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as noted.

Tony Swierczek/09June08

Field Team Leader, CH2M HILL / Date

DAILY QUALITY CONTROL REPORT

Daily Report No: 030

Date: 06/12/08

Weather: Clear and sunny

Precip.: None

°F Temp: Min: 80 Max 92

1. Personnel and Area(s) of Responsibility:

# of Personnel	Trade/Title	Hours (each)	Employer	Location/Work Description
1	Field Team Leader	7	CH2M HILL	Deep monitoring well groundwater sampling, purge/check water quality at MW-115, oversee land surveying, site clean-up
1	Field Team Member	7	CH2M HILL	Deep monitoring well groundwater sampling, purge/check water quality at MW-115, oversee land surveying, site clean-up
2	Land Surveyors	8	Ferguson Surveyors	Survey in all locations associated with the RI fieldwork

2. Equipment Used:

Equipment Description	Qty.	Date of Arrival	Date of Safety Check
Peristaltic pump	1		
Mini-monsoon pump	1		

3. Work Performed Today:

Deep Monitoring Well Groundwater Sampling

CH2M HILL staff was onsite to collect groundwater samples at monitoring well MW-117. The well was purged until at least 2 system volumes were removed and groundwater parameters had stabilized. Approximately 2.0 gallons of water were purged from MW-117. The samples were submitted for laboratory analysis of VOCs. All samples were immediately placed on ice and then shipped via FedEx for priority overnight delivery.

Water Quality Check at MW-115

CH2M HILL mobilized to newly-installed shallow monitoring well MW-115 to purge the well and check the pH following recharge. Approximately 9 gallons of groundwater was removed prior to the well pumping dry. Monitoring well MW-115 was allowed to recharge for approximately 4 hours prior to checking water quality. A YSI 650 MDS was utilized to check the pH. The pH concentration was recorded at 10.42 units, slightly lower than the concentration observed during groundwater sampling activities on June 5.

Land Surveying

Ferguson Surveyors were onsite to survey all locations associated with the RI fieldwork. The 2-person crew utilized a robotic total station to record horizontal and vertical data at the surface soil locations, MIP locations, confirmation boring locations, and newly-installed monitoring well locations.

4. Results of Control Activities:

Not applicable

5. Tests Performed as Required by Plans and/or Specifications:

None.

6. Materials Received:

Description	Quantity	No. of Trucks	Compliant with Specs?
Not applicable			

7. Submittals Reviewed and Approved:

Submittal Number(s)	Applicable Specification: Plan Section	Approved By	Action
Not applicable			

8. Verbal Instructions Given/Controversial Matters:

None.

9. Job Safety: (Report violations; corrective instructions given; corrective action taken)

A site safety meeting was held onsite. A Pre-Task Safety Plan was reviewed and signed. The Health & Safety Plan, Site Security Plan, and BBLPS were reviewed with the field staff and subcontractor. Walking hazards, heat-related hazards, PPE, emergency contacts, and the hospital route were discussed. No safety violations were observed.

10. Remarks:

None.

11. Lost Days/Time Impacts/Equipment Repairs:

None.

12. Near Future Plans

- Completion of land surveying activities (No oversight by CH2M HILL)

On behalf of Conti Environmental, Inc. and its' subcontractors, I certify that this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as noted.

Tony Swierczek/12June08

Field Team Leader, CH2M HILL / Date

Field Change Notices

FIELD CHANGE NOTICE

Contract No.: W912DQ-D-05-0002
 Delivery Order No.: 0007
 Project Name: Former St. Louis Ordnance Plant,
St. Louis, Missouri

FCN No.: 001
 Page: 1 of 1
 Date: 5/16/2008
 Revision No.: 0

ORIGINAL REQUIREMENTS:

In accordance with shallow monitoring well installation procedures detailed in the May 2008 Remedial Investigation Work Plan (Field Sampling Plan), the type of grout used for the annular seal will consist of high solids sodium bentonite slurry, at least 20 to 30 percent weight by solids. The grout will be mixed in accordance with manufacturer's instructions to achieve a density of at least 9.4 pounds per gallon. The grout density will be measured with a mud scale after each batch has been mixed to ensure the proper density has been achieved. The monitoring wells will be completed with flush-mount well protectors. The flush-mount well protector will consist of a watertight well vault equipped with a cast-iron lid and aluminum skirt.

FIELD CHANGE & DOCUMENTATION:

DOCUMENTED BY: Anthony Swierczek

During shallow monitoring well installation, it was noted that the drillers were not equipped with a mud scale to properly mix the high solids sodium bentonite slurry to specifications. Previous experience with these drillers has demonstrated that their standard mixture has achieved the minimum grout density required by manufacturers. The drillers were instructed to mix a thicker batch of grout slurry to be conservative and ensure that the density specification was met. As instructed the driller mixed and installed a thicker batch of grout that did not settle between the time it was placed and the well protector was installed at MW-116. A 4' x 4' concrete pad will be installed at MW-115 during the week of May 19, 2008.

During shallow monitoring well installation at MW-115, it was noted that thick vegetation and ground cover in the area may impede future groundwater sampling events at MW-115. To reduce the chance of thick vegetation obscuring the location of MW-115, CH2M HILL field staff and the Task Manager decided to install the monitoring well as an above ground completion.

TECHNICAL JUSTIFICATION:

Previous experience with these drillers has demonstrated that their standard mixture has achieved the minimum grout density required by manufacturers. Monitoring well MW-115 was completed above ground due to thick vegetation and ground cover in the area.


SUBMITTAL(S) REFERENCE NO.:

REASON FOR CHANGE	<input checked="" type="checkbox"/> Modification	<input type="checkbox"/> Addition/Deletion	
WVN REQUIRED	<input checked="" type="checkbox"/> NO	<input type="checkbox"/> YES	CHANGE ORDER NO.: <u>NA</u>
POP EXTENSION REQUIRED	<input checked="" type="checkbox"/> NO	<input type="checkbox"/> YES	Additional Time (wk): <u>NA</u>

APPLICABLE CONTRACT DOCUMENT(S):

Remedial Investigation Work Plan, Field Sampling Plan

CONTRACTOR APPROVAL



Luis Seljido, PE
 Project Manager

05/23/08
 Date



Jeffrey Haberl
 QCO

05/23/08
 Date

USACE APPROVAL

CONREP

 Date

COR

 Date

This direction, whether later determined to be fee bearing or not, shall not be considered authorization to exceed the current contract Estimated Cost under the Schedule. The Government is not obligated to reimburse the contractor for costs incurred in excess of the estimated costs specified in the schedule. The contractor is not obligated to continue performance under this contract including action under the Termination Clause of this contract, or otherwise incur costs in excess of the estimated cost specified in the schedule, until the Contracting Officer (I) notifies the contractor in writing that the estimated cost has been increased and (ii) provides a revised estimated total cost of performing this contract.

FIELD CHANGE NOTICE

Contract No.: W912DQ-D-05-0002
 Delivery Order No.: 0007
 Project Name: Former St. Louis Ordnance Plant,
St. Louis, Missouri

FCN No.: 001
 Page: 1 of 1
 Date: 5/16/2008
 Revision No.: 0

ORIGINAL REQUIREMENTS:

In accordance with shallow monitoring well installation procedures detailed in the May 2008 Remedial Investigation Work Plan (Field Sampling Plan), the type of grout used for the annular seal will consist of high solids sodium bentonite slurry, at least 20 to 30 percent weight by solids. The grout will be mixed in accordance with manufacturer's instructions to achieve a density of at least 9.4 pounds per gallon. The grout density will be measured with a mud scale after each batch has been mixed to ensure the proper density has been achieved. The monitoring wells will be completed with flush-mount well protectors. The flush-mount well protector will consist of a watertight well vault equipped with a cast-iron lid and aluminum skirt.

FIELD CHANGE & DOCUMENTATION:

DOCUMENTED BY:

Anthony Swierczek

During shallow monitoring well installation, it was noted that the drillers were not equipped with a mud scale to properly mix the high solids sodium bentonite slurry to specifications. Previous experience with these drillers has demonstrated that their standard mixture has achieved the minimum grout density required by manufacturers. The drillers were instructed to mix a thicker batch of grout slurry to be conservative and ensure that the density specification was met. As instructed the driller mixed and installed a thicker batch of grout that did not settle between the time it was placed and the well protector was installed at MW-116. A 4' x 4' concrete pad will be installed at MW-115 during the week of May 19, 2008.

During shallow monitoring well installation at MW-115, it was noted that thick vegetation and ground cover in the area may impede future groundwater sampling events at MW-115. To reduce the chance of thick vegetation obscuring the location of MW-115, CH2M HILL field staff and the Task Manager decided to install the monitoring well as an above ground completion. The completion consists of PVC casing extending approximately 3' above surface grade. A steel protective casing will be installed over the PVC casing and grouted at a depth 1' bgs. The well is located in an area with no vehicular traffic, so protective bollards will not be installed.

TECHNICAL JUSTIFICATION:

Previous experience with these drillers has demonstrated that their standard mixture has achieved the minimum grout density required by manufacturers. Monitoring well MW-115 was completed above ground due to thick vegetation and ground cover in the area.

SUBMITTAL(S) REFERENCE NO.:

REASON FOR CHANGE	<u>X</u> Modification	<u> </u> Addition/Deletion	
WVN REQUIRED	<u>X</u> NO	<u> </u> YES	CHANGE ORDER NO.: <u> </u> NA
POP EXTENSION REQUIRED	<u>X</u> NO	<u> </u> YES	Additional Time (wk): <u> </u> NA

APPLICABLE CONTRACT DOCUMENT(S):


Remedial Investigation Work Plan, Field Sampling Plan

CONTRACTOR APPROVAL



Luis Seijido, PE
 Project Manager

05/23/08
 Date



Jeffrey Haberl
 QCO

05/23/08
 Date

USACE APPROVAL

CONREP

Date

COR

Date

This direction, whether later determined to be fee bearing or not, shall not be considered authorization to exceed the current contract Estimated Cost under the Schedule. The Government is not obligated to reimburse the contractor for costs incurred in excess of the estimated costs specified in the schedule. The contractor is not obligated to continue performance under this contract including action under the Termination Clause of this contract, or otherwise incur costs in excess of the estimated cost specified in the schedule, until the Contracting Officer (I) notifies the contractor in writing that the estimated cost has been increased and (ii) provides a revised estimated total cost of performing this contract.

FIELD CHANGE NOTICE

Contract No.: W912DQ-D-05-0002
 Delivery Order No.: 0007
 Project Name: Former St. Louis Ordnance Plant,
St. Louis, Missouri

FCN No.: 002
 Page: 1 of 1
 Date: 5/21/2008
 Revision No.: 0

ORIGINAL REQUIREMENTS:

In accordance with soil and groundwater confirmation sampling procedures detailed in the May 2008 Remedial Investigation Work Plan (Field Sampling Plan), confirmation soil borings will be advanced using DPT methods at a subset of the MIP/CPT borings for the purposes of collecting soil and groundwater grab samples to confirm the MIP/CPT data and to assess discrete chemical concentrations in soil and groundwater. Soil borings advanced for the purposes of obtaining soil grab samples will be continuously sampled using a Geoprobe® Macro-Core® sampling device. Groundwater grab samples will be collected for cVOC analysis using a Geoprobe® Screen Point® groundwater sampling device driven by a DPT rig.

FIELD CHANGE & DOCUMENTATION:

DOCUMENTED BY: Anthony Swierczek

During grab groundwater sampling activities as part of the March 2008 vapor intrusion investigation at residences north of the site, the tight and expansive clays prevented the use of a Geoprobe® Screen Point® groundwater sampling device. In order to collect groundwater samples during confirmation sampling activities, hollow stem augers were used to advance each boring to pre-selected depths. A 1" PVC temporary piezometer equipped with a 5-foot prepacked screen was installed through the augers, completed with sand filter pack from the bottom of the boring to 2 feet above the screen, and a 4-foot thick bentonite seal. In cases where water was not visually encountered in the annular space at the depth of the bentonite seal, a high solids bentonite slurry was placed on top of the seal to prevent vertical migration of groundwater from above. A 4" I.D. continuous sampling tube system within the hollow stem augers was used to log soil and collect samples prior to installation of the temporary piezometers.

TECHNICAL JUSTIFICATION:

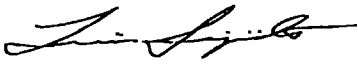

Due to the tight clays at the site, it was not feasible to collect groundwater confirmation samples using a screen point sampler driven to depth by a DPT rig. Soil borings were advanced utilizing hollow stem auger methods, the soil logged, and soil samples collected. Temporary piezometers were installed through the hollow stem augers to minimize risk of borehole swelling shut due to the expansive clays.

SUBMITTAL(S) REFERENCE NO.:

REASON FOR CHANGE	<input checked="" type="checkbox"/> Modification	<input type="checkbox"/> Addition/Deletion	
WVN REQUIRED	<input checked="" type="checkbox"/> NO	<input type="checkbox"/> YES	CHANGE ORDER NO.: <u>NA</u>
POP EXTENSION REQUIRED	<input checked="" type="checkbox"/> NO	<input type="checkbox"/> YES	Additional Time (wk): <u>NA</u>

APPLICABLE CONTRACT DOCUMENT(S):

Remedial Investigation Work Plan, Field Sampling Plan

CONTRACTOR APPROVAL		USACE APPROVAL	
	05/23/08	CONREP	Date
Luis Seijido, PE Project Manager	Date	COR	Date
	05/23/08	This direction, whether later determined to be fee bearing or not, shall not be considered authorization to exceed the current contract Estimated Cost under the Schedule. The Government is not obligated to reimburse the contractor for costs incurred in excess of the estimated costs specified in the schedule. The contractor is not obligated to continue performance under this contract including action under the Termination Clause of this contract, or otherwise incur costs in excess of the estimated cost specified in the schedule, until the Contracting Officer (I) notifies the contractor in writing that the estimated cost has been increased and (ii) provides a revised estimated total cost of performing this contract.	
Jeffrey Haberl QCO	Date		

FIELD CHANGE NOTICE

Contract No.: W912DQ05-D-0002
 Delivery Order No.: 007
 Project Name: St. Louis Ordnance Plant, Former Hanley Area
Remedial Investigation

FCN No.: 003
 Page: 1 of 1
 Date: 5/20/2008
 Revision No.: 0

ORIGINAL REQUIREMENTS:

The sub-contracted air laboratory, Applied Sciences Laboratory (ASL) of Corvallis, OR, to provide analytical services and individually-certified sampling equipment (Summa canisters and flow controllers) for indoor and ambient air samples.

FIELD CHANGE & DOCUMENTATION:

DOCUMENTED BY:

Dave Lee

ASL notified the Project Chemist that the air laboratory was having a systematic problem with blank contamination. ASL was making every attempt to determine the root cause. However, ASL was concerned that they would not be able to certify air canisters in a timely manner and the schedule would be impacted. ASL recommended an alternate laboratory, Columbia Analytical Services (CAS) of Simi Valley, CA. This change in laboratories was implemented.

TECHNICAL JUSTIFICATION:

CAS is technically capable of performing the required analyses and can provide the individually-certified equipment in a timely manner and ensure that the schedule will not be impacted. CAS will be maintained as the contract laboratory for all future indoor air sampling.

SUBMITTAL(S) REFERENCE NO.:

REASON FOR CHANGE	<input checked="" type="checkbox"/> Modification	<input type="checkbox"/> Addition/Deletion	
WWN REQUIRED	<input checked="" type="checkbox"/> NO	<input type="checkbox"/> YES	CHANGE ORDER NO.: <u>NA</u>
POP EXTENSION REQUIRED	<input checked="" type="checkbox"/> NO	<input type="checkbox"/> YES	Additional Time (wk): <u>NA</u>

APPLICABLE CONTRACT DOCUMENT(S):

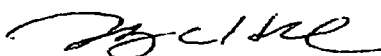
Quality Assurance Project Plan

CONTRACTOR APPROVAL



Luis Seijido, PE
 Project Manager

05/23/08
 Date



Jeffrey Haberl
 QCO

05/23/08
 Date

USACE APPROVAL

CONREP

Date

COR

Date

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FIELD CHANGE NOTICE

Contract No.: **W912DQ-D-05-0002**
 Delivery Order No.: **0007**
 Project Name: **Former St. Louis Ordnance Plant,
 St. Louis, Missouri**

FCN No.: **4**
 Page: **1 of 1**
 Date: **6/11/2008**
 Revision No.: **0**

ORIGINAL REQUIREMENTS:

In accordance with groundwater monitoring well installation procedures detailed in the May 2008 Remedial Investigation Work Plan (Field Sampling Plan), all monitoring wells will be completed with a properly sized and graded, thoroughly washed, sound, durable, well-rounded siliceous sand filter pack. A bentonite seal will be installed atop the sand filter pack. A minimum of 1 hour will elapse between installing the bentonite seal and completing the remaining annular space. The type of grout used for the annular seal will consist of high solids sodium bentonite slurry, at least 20 to 30 percent weight by solids.

In addition, the steel isolation casing at the deep monitoring well will be installed 5 feet into competent bedrock and set in place with cement grout. The grout will be allowed to cure for no less than 48 hours prior to installation of the monitoring well.

FIELD CHANGE & DOCUMENTATION:

DOCUMENTED BY:

Anthony Swierczek

The annular space above the bentonite seal at shallow monitoring wells MW-115 and MW-116 were completed with cement-bentonite grout. The completion details for each well are as follows: **MW-115:** Screen from 43-33' bgs, Riser from 33' bgs to 2.68' above ground surface, Sand Filter Pack from 44.4-31' bgs, Hydrated Bentonite from 31-29' bgs, Cement-Bentonite Grout from 29' bgs to ground surface. **MW-116:** Screen from 28-18' bgs, Riser from 18' bgs to ground surface, Hydrated Bentonite from 35-30' bgs, Sand Filter Pack from 30-16' bgs, Hydrated Bentonite from 16-14' bgs, Cement-Bentonite Grout from 14' bgs to ground surface.

The steel casing at deep monitoring well MW-117 was set at 44' bgs. Prior to placement of the steel casing, cement grout was tremmed from 44-41' bgs and allowed to set for approximately one hour. The steel casing was then inserted into the borehole at the termination depth (44') and the annular space grouted with cement grout from the bottom to ground surface. Cement grout was also placed within the casing from the base of the casing to 23.75' bgs. During the curing process, it was noted that water was recharging into the casing. It was subsequently decided to pump the water from the casing and fill the remainder of the casing with cement grout. The initial volume of grout within the casing (44-23.75' bgs) was allowed to set for approximately 8 days prior to installation of the deep monitoring well. The volume of grout introduced into the casing from 23.75' bgs to ground surface was allowed to set for approximately 44 hours prior to well installation. The deep monitoring well was completed in accordance with the Work Plan (Field Sampling Plan).

TECHNICAL JUSTIFICATION:

Cement-bentonite was used during shallow monitoring well completion as it is the preferred annular seal by USACE standards. Hydrated bentonite was not used as the seal between the sand filter pack and the annular seal during deep monitoring well installation. As a high solids sodium bentonite slurry was used as the annular seal at the deep monitoring well, a hydrated bentonite seal was not necessary.

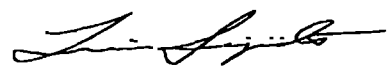
SUBMITTAL(S) REFERENCE NO.:


REASON FOR CHANGE	<input checked="" type="checkbox"/> Modification	<input type="checkbox"/> Addition/Deletion	
WVN REQUIRED	<input checked="" type="checkbox"/> NO	<input type="checkbox"/> YES	CHANGE ORDER NO.: NA
POP EXTENSION REQUIRED	<input checked="" type="checkbox"/> NO	<input type="checkbox"/> YES	Additional Time (wk): NA

APPLICABLE CONTRACT DOCUMENT(S):

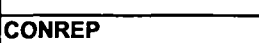
Remedial Investigation Work Plan, Field Sampling Plan

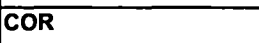
CONTRACTOR APPROVAL


 Luis Seijido, PE
 Project Manager
 Date: 06/11/08


 Jeffrey Haberl
 QCO
 Date: 06/11/08

USACE APPROVAL


 CONREP
 Date


 COR
 Date

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Quality Control Documentation

PREPARATORY PHASE CHECKLIST

Contract No: W912D05-D-0002 Delivery Order 0007

Date: 05/01/08

Definable Feature(s):

1. Implement the Work Plan for the Remedial Investigation

Government Rep Notified: _____ Hours in Advance Yes X No _____

I. Personnel Present

Name	Position	Company/Government
Dan Price	Task Manager	CH2M HILL
Chris English	Project Manager	CH2M HILL
Jim Meier	Senior Consultant	CH2M HILL
Tiffany Swoveland Chapman	Technical Specialist	CH2M HILL
Barrie Selcoe	Human Health Risk Assessor	CH2M HILL
Dave Lee	Project Chemist	CH2M HILL
Tony Swierczek	Field Team Lead	CH2M HILL
Glynn Roberts	Field Team Member	CH2M HILL
Wayne Conway	Field Team Member	CH2M HILL
Jeff Haberl	QA/QC Oversight	CH2M HILL

(List additional personnel on reverse side)

II. Submittals

1. Review submittals and/or submittal log. Have all submittals been approved? Yes X No _____

2. Are all materials and submittals on hand and available? Yes X No _____

3. Check approved submittals against delivered material (This should be done as material arrives).

Not applicable

III. Material Storage

Are materials/equipment stored properly? Yes X No _____

Material storage evaluated upon implementation of field activities.

IV Specifications

Preparatory phase meeting covered aspects of the RI Work Plan including overview of the project, project team member roles and responsibilities, stakeholder information, project communications, critical success factors, and the RI scope of work. The scope of work predominantly covered the investigation approach. The project team members

openly discussed questions pertaining to the scope of work to ensure logistics were properly taken care of prior to mobilizing to the site.

V. Preliminary Work and Permits

Utility clearance conducted. Field team lead has met with utility locate personnel.

Stakeholders and property owners affected by RI field activities notified of start date.

Property access agreement to work on JobCorps property still pending.

VI. Inspection and Testing

1. Have all tests identified in the Work Plan been identified? Note test and inspection to be performed, frequency and by whom.

Not applicable

VII. Safety

1. Safety tailgate meeting held prior to start of work? Yes X No
2. Activity Hazard Analysis approved? Yes X No

VIII. U.S. Corps of Engineers comments during meeting.

USACE representative not present at the time of the preparatory phase meeting.

Jeffrey C. Haberl
CH2M HILL Representative

INITIAL PHASE CHECKLIST

Contract No.: W912DQ-DQ-05-D-0002, Task Order 0007

Date: 5/14/08

Definable Feature(s):

1. Hand auger borings to collect surface soil samples for metals analysis

Work Plan Objective: Advance hand auger borings to 2 feet bgs at up to 32 locations in the areas of Buildings 219B, C, E, and F; along the south property boundary in the areas of former Buildings 228B, 228G, and 228Z; and near former Building 220. Surface soil samples will be submitted for lead, arsenic, or TCLP RCRA metal analysis, depending on the boring location, as specified in the Work Plan. Lead and arsenic samples to be run on a 24-hour turn around time.

The work was evaluated against the Work Plan to ensure procedures were followed. The following is a general summary of specific aspects focused on while observing activities:

- A) Using a hand auger, advance soil borings to 2 feet bgs or refusal, whichever is encountered first.
- B) Document soil lithology
- C) Place soil in a clean stainless steel bowl
- D) Remove material such as concrete and asphalt from soil
- E) Homogenize soil
- F) Place sample in laboratory-supplied sample containers and label
- G) Decontaminate non-disposable equipment

Government Rep Notified: _____ Hours in Advance Yes X No _____

I. Personnel Present

	Name	Position	Company/Government
1.	Glynn Roberts	Field Geologist	CH2M HILL
2.	Wayne Conway	Field Geologist	CH2M HILL
3.	Jeff Haberl	QCO	CH2M HILL
4.			
5.			

II. Identify full compliance with procedure identified at preparatory.

Comments: The following summarizes the status of the compliance with the project specifications for Each Definable Feature of Work at the time of the Initial Inspections.

Work was conducted in accordance with the Work Plan and Field Sampling Plan. In one instance a hand auger boring could not be advanced to 2 feet bgs because refusal was encountered on concrete. The sample was collected from surface to a depth of approximately 3" below grade.

III. Preliminary Work. Ensure preliminary work is complete and correct. If not, what action is taken?

Comments: The following summarizes the status of the condition of each Definable Feature of Work at the time of the Initial Inspection:

Work was conducted in accordance with the Work Plan and Field Sampling Plan.

IV. Establish Level of Workmanship.

1. Where is work located?
SLOP Former Hanley Area

2. Is a sample panel required: Yes _____ No X

V. Resolve any differences.

No differences observed.

VI. Check Safety.

Review job conditions using EM 385-1-1 and job hazard analysis.

Comments:

Activities conducted in accordance with the health and safety plan.

Jeff Haberl
CH2M HILL Representative

INITIAL PHASE CHECKLIST

Contract No.: W912DQ-DQ-05-D-0002, Task Order 0007

Date: 5/14/08

Definable Feature(s):

1. MIP/CPT boring advancement and data collection

Work Plan Objective: Advance up to 26 MIP/CPT borings on the northern end of the site to better assess the lateral extent and vertical distribution of cVOC contamination in the dissolved-phase plume and subsurface soil as defined by previous wells and direct push borings and to assess the presence of DNAPL near soil boring SB-23 and well MW-111.

The work was evaluated against the Work Plan to ensure procedures were followed. The following is a general summary of specific aspects focused on while observing activities:

- A) Set up and calibrate equipment in accordance with MIP/CPT standards (as appended in the Field Sampling Plan). Ensure equipment is set up in a manner such that damage to trunk line or cables will not occur.
- B) Advance MIP/CPT probe to refusal or competent bedrock, whichever is encountered first, in accordance with MIP/CPT practices and standards.
- C) Observe MIP/CPT output data for potential responses or anomalies.
- D) Decontaminate MIP/CPT rods as they are retracted from the soil boring.
- E) Obtain a hard copy of the MIP/CPT logs. Ensure the logs are correct and scaled properly as observed during advancement of the probes.
- F) Ensure equipment is properly stowed to minimize damage between boring locations.
- G) Abandon boring in accordance with state regulatory requirements.

Government Rep Notified: _____ Hours in Advance Yes ☒ No ☐

I. Personnel Present

	Name	Position	Company/Government
1.	Tony Swierczek	Field Team Lead	CH2M HILL
2.	Jeff Haberl	QCO	CH2M HILL
3.	Thomas Jones	MIP Operator	Precision
4.	Ray	MIP Technician	Precision
5.	Theron	MIP Technician	Precision

II. Identify full compliance with procedure identified at preparatory.

Comments: The following summarizes the status of the compliance with the project specifications for Each Definable Feature of Work at the time of the Initial Inspections.

Work was conducted in accordance with the Work Plan and Field Sampling Plan.

III. Preliminary Work. Ensure preliminary work is complete and correct. If not, what action is taken?

Comments: The following summarizes the status of the condition of each Definable Feature of Work at the time of the Initial Inspection:

Work was conducted in accordance with the Work Plan and Field Sampling Plan. QCO was onsite
as first MIP/CPT boring was advanced. Calibration tests had been conducted and documented by
the field team leader.

IV. Establish Level of Workmanship.

1. Where is work located?
SLOP Former Hanley Area

2. Is a sample panel required: Yes _____ No X

V. Resolve any differences.

No differences observed.

VI. Check Safety.

Review job conditions using EM 385-1-1 and job hazard analysis.

Comments:

Activities conducted in accordance with the health and safety plan.

Jeff Haberl
CH2M HILL Representative

INITIAL PHASE CHECKLIST

Contract No.: W912DQ-DQ-05-D-0002, Task Order 0007

Date: 5/21/08

Definable Feature(s):

1. Confirmation soil and groundwater sample collection

Work Plan Objective: Collect soil and groundwater confirmation samples for cVOC analysis from a select number of soil borings to confirm ECD responses during the MIP survey. Also collect geotechnical samples from a subset of the confirmation soil borings. The location of the borings and sample depth intervals will be determined following completion of the MIP survey.

The work was evaluated against the Work Plan to ensure procedures conducted to successfully complete the definable feature were followed. Due to the number of steps involved with these procedures, a general summary has not been provided in this checklist.

Government Rep Notified: _____ Hours in Advance Yes ☒ No ☐

I. Personnel Present

	Name	Position	Company/Government
1.	Glynn Roberts	Field Geologist	CH2M HILL
2.	Tony Swierczek	Field Team Lead	CH2M HILL
3.	Jeff Haberl	QCO	CH2M HILL
4.			
5.			

II. Identify full compliance with procedure identified at preparatory.

Comments: The following summarizes the status of the compliance with the project specifications for Each Definable Feature of Work at the time of the Initial Inspections.

The project team met prior to performing the soil and groundwater confirmation sampling to determine the soil boring locations, sample intervals, and drilling/temporary piezometer installation methods to successfully collect samples. Work conducted in field was performed in accordance with the directives of this meeting. Some soil boring locations required offsets due to the close proximity to overhead high-voltage lines. Field change notices were produced and submitted to USACE because the drilling and temporary piezometer construction methods were changed from the Work Plan (hollow-stem auger w/ 4" continuous core barrel sampler used instead of direct-push technology methods, temporary pre-pack piezometers installed rather than using a screen point sampling device). These changes were made because of the geologic and hydrogeologic conditions. Field screening and sampling methods were conducted in accordance with the Field Sampling Plan.

III. Preliminary Work. Ensure preliminary work is complete and correct. If not, what action is taken?

Comments: The following summarizes the status of the condition of each Definable Feature of Work at the time of the Initial Inspection:

Work was conducted in accordance with the Work Plan documents. QCO worked with the field team to determine the best way to prevent potentially shallow water from potentially migrating down the borehole and influencing groundwater sampled from the targeted zone. Sand filter pack was constructed around the pre-pack well screen and a bentonite seal was constructed atop the sand filter pack. Instruction was given that any water added to hydrate the bentonite seal was to be purged from the temporary piezometer prior to sampling. Due to the temporary nature of the piezometer, the remainder of the annular space above the seal remained open.

IV. Establish Level of Workmanship.

1. Where is work located?
SLOP Former Hanley Area

2. Is a sample panel required: Yes _____ No X

V. Resolve any differences.

None observed.

VI. Check Safety.

Review job conditions using EM 385-1-1 and job hazard analysis.

Comments:

Activities conducted in accordance with the health and safety plan. Field team cognizant of underground and above-ground utilities.

Jeff Haberl
CH2M HILL Representative

INITIAL PHASE CHECKLIST

Contract No.: W912DQ-DQ-05-D-0002, Task Order 0007

Date: 5/16/08

Definable Feature(s):

1. Shallow monitoring well installation

Work Plan Objective: Install two shallow groundwater monitoring wells to supplement the existing monitoring well network in the area of former Building 220 at the north end of the site.

The work was evaluated against the Work Plan to ensure procedures were followed. The following is a general summary of specific aspects focused on while observing activities:

- A) Install monitoring wells using hollow stem auger techniques.
- B) Continuously collect soil cores from the borehole and log/screen in accordance with the Work Plan and Field Sampling Plan.
- C) Well screen and riser to be constructed of 2-inch diameter, factory manufactured, flush-jointed and threaded, Schedule 40 PVC riser and screen (0.01 inch slot size). Well screen will be 10 feet long.
- D) Annular space around well screen will be completed with properly sized and graded siliceous sand. Sand will extend to at least 2 feet above the top of the well screen. Depth of sand will be measured during placement.
- E) Bentonite seal comprised of granular bentonite at least 2 feet thick will be completed above the sand pack. Seal will be allowed to cure for at least 1 hour before completing remainder of monitoring well. Depth to the top of the seal will be measured after the 1 hour time period has elapsed.
- F) Remainder of annular space to be completed with high solids sodium bentonite slurry, at least 20 to 30 percent weight by solids. The grout will be tremied in place using a side-discharge tremie pipe. The grout density will be measured with a mud scale after each batch to achieve a minimum density of 9.4 pounds per gallon.
- G) Monitoring wells will be completed with flush-mount well protectors constructed in a 4 foot by 4 foot concrete pad.
- H) Augers and downhole tooling will be decontaminated between monitoring well locations.

Government Rep Notified: _____ Hours in Advance Yes ☒ No ☐

I. Personnel Present

	Name	Position	Company/Government
1.	Glynn Roberts	Field Geologist	CH2M HILL
2.	Wayne Conway	Field Geologist	CH2M HILL
3.	Jeff Haberl	QCO	CH2M HILL
4.	Adam Matzenbacher	Driller	MRK Environmental
5.	Adam Shields	Driller Helper	MRK Environmental

II. Identify full compliance with procedure identified at preparatory.

Comments: The following summarizes the status of the compliance with the project specifications for Each Definable Feature of Work at the time of the Initial Inspections.

Borehole advanced, logged, and screened in accordance with Work Plan and Field Sampling Plan.
Monitoring well was installed in general accordance with the submittals. Drillers did not have material and tooling available to tremie in bentonite slurry. See Section V for resolution of this problem.

Because the borehole was advanced through concrete in an alley, a 4 foot by 4 foot concrete pad was not constructed. Rather, a circular pad was completed. The diameter of the pad is sufficiently larger than the flush mount well vault in accordance with state well construction standards.

III. Preliminary Work. Ensure preliminary work is complete and correct. If not, what action is taken?

Comments: The following summarizes the status of the condition of each Definable Feature of Work at the time of the Initial Inspection:

QCO observed advancement of the monitoring well to total depth. QCO was unable to be onsite during actual installation of the monitoring well. The QCO interviewed the field team the day after well installation to confirm construction was in accordance with the Work Plan and Field Sampling Plan. QCO was onsite during discussion and resolution of the problem where the drillers did not have material and equipment to tremie grout in place (See Section V).

IV. Establish Level of Workmanship.

1. Where is work located?
6317 Stratford Avenue

2. Is a sample panel required: Yes _____ No X

V. Resolve any differences.

Field team stopped the monitoring well installation activities after achieving total borehole depth until the drillers obtained materials and equipment to tremie bentonite slurry. A grout scale was not available. Previous experience with these drillers has demonstrated that their standard mixture has achieved the minimum grout density required by manufacturers. Drillers mixed a thicker batch of slurry to be conservative. The grout did not settle between the time it was placed and the well protector was installed (72 hours). A field change notice will be prepared documenting the non-use of a grout scale.

VI. Check Safety.

Review job conditions using EM 385-1-1 and job hazard analysis.

Comments:
Activities conducted in accordance with the health and safety plan.

Jeff Haberl
CH2M HILL Representative

INITIAL PHASE CHECKLIST

Contract No.: W912DQ-DQ-05-D-0002, Task Order 0007

Date: 5/29/08

Definable Feature(s):

1. Shallow monitoring well development

Work Plan Objective: Develop monitoring wells no sooner than 48 hours after installation.

The work was evaluated against the Work Plan to ensure procedures were followed. The following is a general summary of specific aspects focused on while observing activities:

- A) Measure the depth to groundwater and total well depth prior to developing
- B) Ensure all downhole equipment is clean and in working order before deploying in well
- C) Surge the entire length of the well screen with a surge block
- D) Purge five times the well volume (including sand filter pack) from well using a submersible high-flow pump
- E) Monitor groundwater quality parameters including pH, specific conductivity, temperature, and turbidity
- F) Continue developing until the required well volume is removed and the well water parameters have stabilized according to the following conditions:

- a) The temperature, pH, and specific conductivity have stabilized to ± 1 degree Celsius ($^{\circ}\text{C}$), ± 0.1 pH units, and ± 5 percent milliSiemens per centimeter, respectively, over three consecutive readings (10-minute interval readings) at a pumping rate no less than the pumping rate used for sampling (approximately 0.5 liter per minute).
- b) The turbidity remains within a 10 NTU range below 25 NTUs for at least 30 minutes, and other parameters have stabilized to above criteria.
- c) If, after 3 hours of purging, the turbidity is below 25 NTUs, but has not stabilized within the 10 NTU range, and other parameters have stabilized to the above criteria, then the well will be considered developed.
- d) A well is considered developed if it purged dry.

- G) Decontaminate field equipment

Government Rep Notified: _____ Hours in Advance Yes ☒ No ☐

I. Personnel Present

	Name	Position	Company/Government
1.	Glynn Roberts	Field Geologist	CH2M HILL
2.	Tony Swierczek	Field Team Lead	CH2M HILL
3.	Jeff Haberl	QCO	CH2M HILL
4.	Joey Brown	Driller	MRK Environmental
5.			

II. Identify full compliance with procedure identified at preparatory.

Comments: The following summarizes the status of the compliance with the project specifications for Each Definable Feature of Work at the time of the Initial Inspections.

Work completed in accordance with the preparatory phase meetings and Work Plan documents.

III. Preliminary Work. Ensure preliminary work is complete and correct. If not, what action is taken?

Comments: The following summarizes the status of the condition of each Definable Feature of Work at the time of the Initial Inspection:

Preliminary work conducted in accordance with the Work Plan documents. The monitoring well developed during the QC inspection was purged dry before parameters stabilized. Therefore, the well is considered developed. Some groundwater was allowed to recharge and the well purged dry two additional times to verify that the sand filter pack was adequately filtering fines from groundwater recharging into the well. The turbidity of the water decreased each time the groundwater was allowed to recharge the well purged dry indicating that the sand filter pack had been properly developed.

IV. Establish Level of Workmanship.

1. Where is work located?
6317 Stratford Avenue

2. Is a sample panel required: Yes _____ No X

V. Resolve any differences.

None

VI. Check Safety.

Review job conditions using EM 385-1-1 and job hazard analysis.

Comments:

Activities conducted in accordance with the health and safety plan.

Jeff Haberl
CH2M HILL Representative

FOLLOW-UP PHASE CHECKLIST

Contract No.: W912DQ-05-D-0002, T.O. 0007

Date: 5/16/08

I. Definable Feature(s):

1. MIP/CPT boring advancement and data collection

II. Personnel Present:

	Name	Position	Company/Government
1	Tony Swierczek	Field Team Lead	CH2M HILL
2	Jeff Haberl	QCO	CH2M HILL
3	Thomas Jones	MIP Operator	Precision
4	Ray	MIP Technician	Precision
5	Theron	MIP Technician	Precision

III. Identify compliance with procedure identified at preparatory and initial control phases:

Comments: Procedures compliant with those conducted at the time of preparatory and initial control phase inspections. Subcontractor was diligent in diagnosing and fixing any equipment problems in the field without potentially sacrificing data quality.

IV. Verification of Level of Workmanship:

- 1) Where is work located? SLOP Former Hanley Area
- 2) Is work consistent with initial control phase? Yes

V. Document Differences Identified (if any) and Describe Resolution:

Comments: None

VI. Check Safety:

Safety protocol followed.

VII. Follow-Up Inspection Performed By:

Jeff Haberl
CH2M HILL Quality Control Officer

FOLLOW-UP PHASE CHECKLIST

Contract No.: W912DQ-05-D-0002, T.O. 0007

Date: 5/24/08

I. Definable Feature(s):

1. Indoor Air Sampling

II. Personnel Present:

	Name	Position	Company/Government
1	Glynn Roberts	Field Team Leader	CH2M HILL
2	Jeff Haberl	QCO	CH2M HILL
3	Dan Price	Task Manager	CH2M HILL
4	Josephine Newton-Lund	Project Manager	USACE - KC District
5	Mr. Petty	Homeowner	--
6	Julie Jennings	USEPA Oversight	Chamberlin Group

III. Identify compliance with procedure identified at preparatory and initial control phases:

Comments: Procedures compliant with those conducted at the time of preparatory and initial control phase inspections. Two Summa canisters were set in the basement of the house. One was placed at the northeast corner, and the second was placed on the southwest corner. A field duplicate was also placed at the southwest corner. One ambient air canister was set on the north side of the house under the back porch, out of view from passers by. These locations are the same as those sampled during the Vapor Intrusion work. The project team verified with Mr. Petty that conditions or chemical use in the house has not changed since the last sampling event. The field team lead checked the canister pressures prior to connecting the flow controllers. The flow controllers are set for a 24-hour sample time.

IV. Verification of Level of Workmanship:

- 1) Where is work located? 6317 Stratford Avenue
- 2) Is work consistent with initial control phase? Yes

V. Document Differences Identified (if any) and Describe Resolution:

Comments: None

VI. Check Safety:

Safety protocol followed.

VII. Follow-Up Inspection Performed By:

Jeff Haberl
CH2M HILL Quality Control Officer

Data Quality Evaluation Report

**St. Louis Ordnance Plant
Former Hanley Area
St. Louis, Missouri**

Submitted to
**U.S. Army Corps of Engineers
Kansas City District**

November 2009

CH2MHILL

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Acronyms and Abbreviations

ASL	Applied Sciences Laboratory
CAS	Columbia Analytical Services
DQE	data quality evaluation
EB	equipment rinsate blank
EDB	1,2-Dibromomethane
FD	field duplicate
LCS	laboratory control sample
MS/MSD	matrix spike/matrix spike duplicate
N	normal sample
PARCC	precision, accuracy, representativeness, completeness, comparability
QA	quality assurance
QAPP	quality assurance project plan
QC	quality control
RPD	relative percent difference
SDG	sample delivery group
SVOC	semi-volatile organic compound
TB	trip blank
VOC	volatile organic compound

Introduction

This Data Quality Evaluation (DQE) report assesses the quality of analytical results for samples collected during the remedial investigation at the former Hanley Area, St. Louis Ordnance Plant located in St. Louis, Missouri. Soil, groundwater, and air samples were collected from March 18 to June 12, 2008 and analyzed in support of a remedial investigation at the site. Individual method requirements and guidelines from the *Final Quality Assurance Project Plan, St. Louis Ordnance Plant, Former Hanley Area, St. Louis, Missouri* (QAPP) (CH2M HILL 2007) were used as the basis for this assessment. This report is intended as a general data quality assessment designed to summarize data issues.

Analytical Approach

The sampling and analysis objective was to characterize the extent of contamination in surface soil, subsurface soil, and groundwater at the former Hanley Area.

Analytical Data

The DQE includes 34 normal (N) soil samples, 6 soil field duplicates (FD), 22 N water samples, 4 water FD, 6 N air samples, and 2 air FD. A list of samples, collection dates, and associated sample delivery groups (SDG) is provided in Table 1. The soil and water analyses were performed by PEL of Tampa, Florida. The air analyses were performed by Applied Sciences Laboratory (ASL) of Corvallis, Oregon and Columbia Analytical Services (CAS) of Simi Valley, California.

Fourteen methods were used to analyze the environmental samples. Samples were collected and shipped by overnight carrier to the laboratory for analysis. Selected samples were analyzed for the methods listed in Table 2.

TABLE 1
Summary of Samples
St. Louis Ordnance Plant, Former Hanley Area, St. Louis, Missouri

Matrix	Sample ID	QA/QC Type	Sample Date	SDG
Air	SLOP-6317-AA-N	N	3/18/2008	H1543
Air	SLOP-6317-AA-N_20080529	N	5/29/2008	P0801616
Air	SLOP-6317-IA-NE	N	3/18/2008	H1543
Air	SLOP-6317-IA-NE_20080529	N	5/29/2008	P0801629
Air	SLOP-6317-IA-SW	N	3/18/2008	H1543
Air	SLOP-6317-IA-SW_20080529	N	5/29/2008	P0801629
Air	SLOP-6317-IA-SW-FD	FD	3/18/2008	H1543
Air	SLOP-6317-IA-SW-FD_20080529	FD	5/29/2008	P0801629
Air	SLOP-TB-03192008	TB	3/18/2008	H1543
Air	TB-052908A	TB	5/29/2008	P0801629

TABLE 1**Summary of Samples***St. Louis Ordnance Plant, Former Hanley Area, St. Louis, Missouri*

Matrix	Sample ID	QA/QC Type	Sample Date	SDG
Soil	CB-01-S-30	N	5/21/2008	2509330
Soil	CB-02-S-30	N	5/21/2008	2509330
Soil	CB-03-S-8	N	5/22/2008	2509349
Soil	CB-04-S-19	N	5/22/2008	2509349
Soil	CB-06-S-21.5	N	5/23/2008	2509356
Soil	CB-07-S-2	N	5/29/2008	2509399
Soil	FD-051408B	FD	5/14/2008	2509265
Soil	FD-051408C	FD	5/14/2008	2509267
Soil	FD-052108A	FD	5/21/2008	2509330
Soil	FD-S-051308A	FD	5/13/2008	2509258
Soil	FD-S-051308B	FD	5/13/2008	2509258
Soil	FD-S-051408	FD	5/14/2008	2509267
Soil	HA-01-S-00	N	5/13/2008	2509258
Soil	HA-02-S-00	N	5/13/2008	2509258
Soil	HA-03-S-00	N	5/13/2008	2509258
Soil	HA-04-S-00	N	5/13/2008	2509258
Soil	HA-05-S-00	N	5/13/2008	2509258
Soil	HA-05-S-00	N	5/13/2008	2509685
Soil	HA-06-S-00	N	5/13/2008	2509258
Soil	HA-06-S-00	N	5/13/2008	2509685
Soil	HA-07-S-00	N	5/13/2008	2509258
Soil	HA-08-S-00	N	5/13/2008	2509258
Soil	HA-09-S-00	N	5/13/2008	2509258
Soil	HA-10-S-00	N	5/13/2008	2509258
Soil	HA-11-S-00	N	5/13/2008	2509258
Soil	HA-11-S-00	N	5/13/2008	2509685
Soil	HA-12-S-00	N	5/13/2008	2509258
Soil	HA-13-S-00	N	5/13/2008	2509258
Soil	HA-13-S-00	N	5/13/2008	2509685
Soil	HA-14-S-00	N	5/13/2008	2509258
Soil	HA-15-S-00	N	5/13/2008	2509258
Soil	HA-15-S-00	N	5/13/2008	2509685
Soil	HA-16-S-00	N	5/13/2008	2509258

TABLE 1
Summary of Samples
St. Louis Ordnance Plant, Former Hanley Area, St. Louis, Missouri

Matrix	Sample ID	QA/QC Type	Sample Date	SDG
Soil	HA-17-S-00	N	5/14/2008	2509267
Soil	HA-18-S-00	N	5/14/2008	2509267
Soil	HA-19-S-00	N	5/14/2008	2509267
Soil	HA-20-S-00	N	5/14/2008	2509265
Soil	HA-21-S-00	N	5/14/2008	2509265
Soil	HA-22-S-00	N	5/14/2008	2509267
Soil	SLOPUI-033108	N	3/31/2008	2508946
Water	CB-01-W-30	N	5/22/2008	2509349
Water	CB-02-W-30	N	5/22/2008	2509349
Water	CB-04-W-27.5	N	5/23/2008	2509356
Water	CB-06-W-20.5	N	5/23/2008	2509356
Water	Disposal - 1	N	6/6/2008	2509461
Water	Disposal - 2	N	6/6/2008	2509461
Water	EB-052908	EB	5/29/2008	2509399
Water	EB-060608	EB	6/6/2008	2509461
Water	EB-061208	EB	6/12/2008	2509538
Water	FD-W-060408A	FD	6/4/2008	2509443
Water	FD-W-060508A	FD	6/5/2008	2509451
Water	FD-W-060508B	FD	6/5/2008	2509451
Water	MW-106-W-00	N	6/3/2008	2509443
Water	MW-107-W-00	N	6/5/2008	2509451
Water	MW-108-W-00	N	6/4/2008	2509443
Water	MW-109-W-00	N	6/4/2008	2509443
Water	MW-110-W-00	N	6/5/2008	2509451
Water	MW-111-W-00	N	6/6/2008	2509461
Water	MW-112-W-00	N	6/5/2008	2509451
Water	MW-113-W-00	N	6/4/2008	2509443
Water	MW-114-W	N	6/3/2008	2509443
Water	MW-115-W-00	N	6/5/2008	2509451
Water	MW-116-W-00	N	6/4/2008	2509443
Water	MW-117-W-00	N	6/12/2008	2509538
Water	SLOP-4701-5-22	N	3/31/2008	2508946
Water	SLOP-6317-5-25	N	3/31/2008	2508946

TABLE 1

Summary of Samples

St. Louis Ordnance Plant, Former Hanley Area, St. Louis, Missouri

Matrix	Sample ID	QA/QC Type	Sample Date	SDG
Water	SLOP-6321-5-24	N	3/31/2008	2508946
Water	SLOP-6321-5-24-FD	FD	3/31/2008	2508946
Water	SLOPVI-033108	N	3/31/2008	2508946
Water	TB-033108	TB	3/31/2008	2508946
Water	TB-052108	TB	5/21/2008	2509330
Water	TB-052208	TB	5/22/2008	2509349
Water	TB-052308	TB	5/23/2008	2509356
Water	TB-052908	TB	5/29/2008	2509399
Water	TB-060408	TB	6/4/2008	2509443
Water	TB-060508	TB	6/5/2008	2509451
Water	TB-060608	TB	6/6/2008	2509461
Water	TB-061208	TB	6/12/2008	2509538

TABLE 2

Summary of Analytical Methods

St. Louis Ordnance Plant, Former Hanley Area, St. Louis, Missouri

Parameter	Method
Methane, ethane, ethylene	RSK-175
Total solids	SM2540B
Total suspended solids	SM2540D
Volatile suspended solids	SM2540E
Chemical oxygen demand	SM5220C
Anions	E300.1
TCLP metals	SW6010B-TCLP
TCLP mercury	SW7470A-TCLP
Air Volatiles	TO15 SIM
Metals	SW6010B
Mercury	SW7470A
pH	E150.1
SVOC	SW8270C
VOC	SW8260B

Data review and verification were performed in accordance with the QAPP.

One hundred percent of the data underwent review and verification that included the following:

- A review of the SDG narrative to identify issues that the laboratory reported in the data deliverable.
- A check of sample integrity (sample collection, chain of custody, preservation, and holding times).
- An evaluation of basic quality control (QC) measurements used to assess the accuracy, precision, and representativeness of data including QC blanks, laboratory control sample/laboratory control sample duplicates (LCS/LCSD), matrix spikes/matrix spike duplicates (MS/MSDs), surrogate recovery when applicable, and field or laboratory duplicate results.
- An evaluation of calibration and QC summary results against the project requirements.
- A review of sample results, target compound lists, and detection limits to verify that project analytical requirements were met.
- A review to verify that corrective actions were initiated, as necessary, based on the data review findings.
- A qualification of the data using appropriate qualifier flags, as necessary, to reflect data usability limitations.
- Other method-specific QC requirements.

Data flags were assigned according to the QAPP. These flags, as well as the reason for each flag, were entered into the electronic database. Multiple flags are routinely applied to specific sample method/matrix/analyte combinations. The data reported were qualified by a single final flag that reflects the most conservative of the applied validation qualifiers. The final flag also includes matrix and blank sample impacts.

The data flags are defined below:

- J = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
- R = The sample result was rejected because of serious deficiencies in the ability to analyze the sample and meet QC criteria. The presence or absence of the analyte could not be verified.
- U = The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- UJ = The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

Findings

The findings of the data review and verification are summarized in the following sections. Those results with data quality deficiencies are noted below. As previously discussed, the flags on the final data tables reflect the most conservative validation qualifier.

Holding Times

All holding-time criteria were met, with the following exception:

- For method SW7470A-TCLP in soil, the holding time was exceeded for samples HA-05-S-00, HA-06-S-00, HA-11-S-00, HA-13-S-00, and HA-15-S-00. For this matrix and method combination, 100 percent of the results were rejected for project use.

Calibration

All initial and continuing calibration requirements were met with the following exceptions:

- For method SW8260B in water, the instrument was not calibrated for 1,1,1,2-tetrachloroethane, 1,1,1-trichloroethane, 1,1,2-trichloroethane, 1,1-dichloropropene, 1,2,3-trichlorobenzene, 1,2,3-trichloropropane, 1,2,4-trichlorobenzene, 1,2,4-trimethylbenzene, 1,2-dibromo-3-chloropropane, 1,2-dibromoethane(EDB), 1,2-dichlorobenzene, 1,3,5-trimethylbenzene, 1,3-dichlorobenzene, 1,3-dichloropropane, 1,4-dichlorobenzene, 2,2-dichloropropane, 2-butanone, 2-chlorotoluene, 2-hexanone, 4-chlorotoluene, 4-isopropyltoluene, 4-methyl-2-pentanone, acetone, acrolein, acrylonitrile, benzene, bromobenzene, bromochloromethane, bromodichloromethane, bromomethane, carbon disulfide, carbon tetrachloride, chloroethane, cis-1,3-dichloropropene, dibromochloromethane, dibromomethane, dichlorodifluoromethane, hexachlorobutadiene, isopropylbenzene (Cumene), methyl iodide, methylene chloride, MTBE, naphthalene, n-butylbenzene, n-propylbenzene, o-xylene, p,m-xylene, sec-butylbenzene, styrene, tert-butylbenzene, trans-1,3-dichloropropene, trichlorofluoromethane, and vinyl acetate. For this matrix and method combination, 0.2 percent of the results were qualified as estimated detected results, 15.5 percent of the results were qualified as estimated nondetected results.
- For method SW8260B in water, the initial calibration relative response factor was below control limits for acrolein. For this matrix and method combination, 0.8 percent of the results were qualified as estimated nondetected results.
- For method SW8260B in water, the continuing calibration response factor was below control limits for acrolein. For this matrix and method combination, 0.3 percent of the results were qualified as nondetected results.
- For method SW8260B in water, the continuing calibration percent drift was above the upper control limit for 2,2-dichloropropane, acetone, acrolein, dichlorodifluoromethane, and vinyl acetate. For this matrix and method combination, 1.0 percent of the results were qualified as nondetected results.

- For method SW8260B in water, two results were greater than the calibration range for carbon tetrachloride. For this matrix and method combination, 0.2 percent of the results were qualified as estimated detected results.

Method Blanks and Instrument Blanks

Method blanks and instrument blanks were analyzed at the required frequency and were free of contamination that would have affected the reported sample results with the following exceptions:

- For method RSK-175 in water, the laboratory method blank had detections for methane. For this matrix and method combination, 33.3 percent of the results were qualified as nondetected results.
- For method SM5220C in water, the laboratory method blank had detections for chemical oxygen demand. For this matrix and method combination, 100 percent of the results were qualified as nondetected results.
- For method SW8260B in water, the laboratory method blank had detections for methylene chloride. For this matrix and method combination, 0.2 percent of the results were qualified as nondetected results.
- For method TO15 SIM in air, the laboratory method blank had detections for tetrachloroethylene. For this matrix and method combination, 2.1 percent of the results were qualified as nondetected results.

Field Blanks

Trip blanks (TB) and equipment rinsate blanks (EB) were collected and analyzed at the required frequency and were free of contamination that would have affected the reported sample results with the following exception:

- For method SW8260B in water, the TB had detections for methylene chloride. For this matrix and method combination, 0.2 percent of the results were qualified as nondetected results.

Field Duplicates

FDs were collected at the required frequency stated in the QAPP (10 percent), with the following exceptions:

- A soil FD was not collected for methods SW6010B-TCLP and SW7470A-TCLP. Field precision cannot be assessed for these methods.
- A water FD was not collected for methods E150.1, SM2540B, SM2540D, SM2540E, and SM5220C. Field precision cannot be assessed for these methods.

A comparison of N sample counts and FD sample counts is presented in Table 3. A list of FDs and associated parent samples is presented in Table 4.

TABLE 3

N and FD Sample Counts by Matrix and Method

St. Louis Ordnance Plant, Former Hanley Area, St. Louis, Missouri

Matrix	Method	N	FD
Air	TO15 SIM	6	2
Soil	SW6010B	19	3
Soil	SW6010B-TCLP	8	1
Soil	SW7470A-TCLP	8	1
Soil	SW8260B	6	1
Soil	SW8260B-TCLP	1	0
Soil	SW8270C	1	1
Water	E150.1	2	0
Water	RSK-175	4	1
Water	SM2540B	2	0
Water	SM2540D	2	0
Water	SM2540E	2	0
Water	SM5220C	2	0
Water	SW300.1	4	1
Water	SW6010B	7	1
Water	SW8260B	22	3

TABLE 4

List of FDs

St. Louis Ordnance Plant, Former Hanley Area, St. Louis, Missouri

Matrix	FD	N
Air	SLOP-6317-IA-SW-FD	SLOP-6317-IA-SW
Air	SLOP-6317-IA-SW-FD_20080529	SLOP-6317-IA-SW_20080529
Soil	FD-051408B	HA-20-S-00
Soil	FD-051408C	HA-22-S-00
Soil	FD-052108A	CB-02-S-30
Soil	FD-S-051308A	HA-09-S-00
Soil	FD-S-051308B	HA-11-S-00
Soil	FD-S-051408	HA-18-S-00
Water	FD-W-060408A	MW-113-W-00
Water	FD-W-060508A	MW-115-W-00
Water	FD-W-060508B	MW-115-W-00
Water	SLOP-6321-5-24-FD	SLOP-6321-5-24

The relative percent differences (RPD) between the N and FD samples are presented in Table 5 (see page M-11). RPDs are calculable when the N and FD results are both detected and the concentration of the reported analytes are greater than five times the reporting limit in either sample. If either sample concentration is less than five times the reporting limit, the RPD is calculable when the difference in sample results is within ± 2 times the reporting limit for waters or within ± 4 times the reporting limit for soils.

The RPDs met acceptance criteria with the following exceptions:

- For method TO15 SIM in air, sample SLOP-63117-IA-SW, the FD RPD was above the upper control limit for trichloroethylene and tetrachloroethylene. For this matrix and method combination, 8.3 percent of the results were qualified as estimated detected results.
- For method SW6010B in soil, sample HA-20-S-00, the FD RPD was above the upper control limit for lead. For this matrix and method combination, 9.1 percent of the results were qualified as estimated detected results.
- For method SW8270C in soil, sample HA-22-S-00, the FD RPD was above the upper control limit for Fluoranthene. For this matrix and method combination, 5.6 percent of the results were qualified as estimated detected results.

Surrogates

Surrogates were added to samples according to method requirements. Surrogate recoveries met the acceptance criteria stated in the QAPP, with only one exception: For method SW8260B in soil, the surrogate percent recovery was above the upper control limit for sample CB-06-S-21.5. For this matrix and method combination, 0.2 percent of the results were qualified as estimated detected results.

Internal Standards

Internal standards were added to samples according to method requirements. Internal standards met the method acceptance criteria.

Laboratory Control Samples

LCS/LCSDs were analyzed, as required, and met all accuracy criteria with the following exceptions:

- For method SW8260B in soil, the LCS percent recovery was below the lower control limit for chloroethane and methylene chloride. For this matrix and method combination, 1.2 percent of the results were qualified as estimated nondetected results.
- For method SW8260B in water, the LCS percent recovery was below the lower control limit for 1,1-dichloroethene, 1,2,3-trichloropropane, 2,2-dichloropropane, 2-butanone, and acrolein. For this matrix and method combination, 0.6 percent of the results were qualified as estimated nondetected results.
- For method SW8260B in soil, the LCS percent recovery was above the upper control limit for 4-methyl-2-pentanone. For this matrix and method combination, 0.2 percent of the results were qualified as estimated detected results.

- For method SW8260B in soil, the LCS/LCSD RPD was above the upper control limit for acrolein, bromomethane, chloroethane, and dibromomethane. For this matrix and method combination, 1.2 percent of the results were qualified as estimated nondetected results.
- For method SW8260B in water, LCS/LCSD RPD was above the upper control limit for 1,2,3-trichloropropane, bromomethane, carbon disulfide, carbon tetrachloride, chloromethane, dichlorodifluoromethane, hexachlorobutadiene, methyl iodide, naphthalene, o-xylene, trichlorofluoromethane, and vinyl chloride. For this matrix and method combination, 0.1 percent of the results were qualified as estimated detected results and 0.8 percent of the results were qualified as estimated nondetected results.

Matrix Spikes

The results of MS/MSD analyses provide information about the possible influence of the matrix on either accuracy or precision of the measurements. MS/MSD samples were collected at the required frequency stated in the QAPP (5 percent), with the following exceptions:

- A soil MS/MSD pair was not collected for methods SW6010B-TCLP, SW7470A, and SW7470A-TCLP. Field precision and matrix effects cannot be assessed for these methods.
- A water MS/MSD pair was not collected for methods E150.1, RSK-175, SM2540B, SM2540D, SM2540E, SM5220C, E300.1, and SW6010B. Field precision and matrix effects cannot be assessed for these methods.

Table 6 presents the MS/MSD sample counts by method and matrix.

TABLE 6
N and MS Sample Counts by Matrix and Method
St. Louis Ordnance Plant, Former Hanley Area, St. Louis, Missouri

Matrix	Method	N	MS/MSD Pairs
Air	TO15 SIM	6	0
Soil	SW6010B	19	3
Soil	SW6010B-TCLP	8	0
Soil	SW7470A-TCLP	8	0
Soil	SW8260B	6	1
Soil	SW8260B-TCLP	1	0
Soil	SW8270C	1	1
Water	E150.1	2	0
Water	RSK-175	4	0
Water	SM2540B	2	0
Water	SM2540D	2	0
Water	SM2540E	2	0
Water	SM5220C	2	0
Water	SW300.1	4	0
Water	SW6010B	7	0
Water	SW8260B	22	3

TABLE 5
 N and FD Relative Percent Difference Comparison
 St. Louis Ordnance Plant, Former Hanley Area, St. Louis, Missouri

Matrix	Method	Analyte	CAS	Units	N	N Result	N RL	N Final Flag	FD	FD Result	FD RL	FD Final Flag	RPD
Air	TO15 SIM	1,2-DCA	107-06-2	µg/m ³	SLOP-6317-IA-SW	0.098	0.038		SLOP-6317-IA-SW-FD	0.088	0.034		NC
Air	TO15 SIM	1,2-Dichloroethane	107-06-2	µg/m ³	SLOP-6317-IA-SW 20080529	0.058	0.04		SLOP-6317-IA-SW-FD 20080529	0.063	0.03		NC
Air	TO15 SIM	cis-1,2-DCE	156-59-2	µg/m ³	SLOP-6317-IA-SW	0.17	0.037		SLOP-6317-IA-SW-FD	0.18	0.033		NC
Air	TO15 SIM	cis-1,2-Dichloroethylene	156-59-2	µg/m ³	SLOP-6317-IA-SW 20080529	0.046	0.04		SLOP-6317-IA-SW-FD 20080529	0.044	0.03		NC
Air	TO15 SIM	TCE	79-01-6	µg/m ³	SLOP-6317-IA-SW	0.52	0.051		SLOP-6317-IA-SW-FD	1.1	0.045		71.6 %
Air	TO15 SIM	Tetrachloroethylene	127-18-4	µg/m ³	SLOP-6317-IA-SW	0.44	0.064		SLOP-6317-IA-SW-FD	0.91	0.057		69.6 %
Air	TO15 SIM	Tetrachloroethylene(PCE)	127-18-4	µg/m ³	SLOP-6317-IA-SW 20080529	0.11	0.04		SLOP-6317-IA-SW-FD 20080529	0.1	0.03		NC
Air	TO15 SIM	trans-1,2-DCE	156-60-5	µg/m ³	SLOP-6317-IA-SW	0.023	0.037	J	SLOP-6317-IA-SW-FD	0.013	0.033	J	NC
Air	TO15 SIM	trans-1,2-Dichloroethene	156-60-5	µg/m ³	SLOP-6317-IA-SW 20080529	0.043	0.04	U	SLOP-6317-IA-SW-FD 20080529	0.036	0.03	U	NC
Air	TO15 SIM	Trichloroethylene (TCE)	79-01-6	µg/m ³	SLOP-6317-IA-SW 20080529	0.14	0.01		SLOP-6317-IA-SW-FD 20080529	0.13	0.01		7.4 %
Air	TO15 SIM	Vinyl Chloride	75-01-4	µg/m ³	SLOP-6317-IA-SW	0.024	0.024	U	SLOP-6317-IA-SW-FD	0.0047	0.021	J	NC
Air	TO15 SIM	VINYL CHLORIDE	75-01-4	µg/m ³	SLOP-6317-IA-SW 20080529	0.043	0.04	U	SLOP-6317-IA-SW-FD 20080529	0.036	0.03	U	NC
Soil	SW6010B	Arsenic	7440-38-2	mg/kg	HA-09-S-00	7.09	1.28		FD-S-051308A	5.9	0.6383		18.3 %
Soil	SW6010B	Arsenic	7440-38-2	mg/kg	HA-11-S-00	9.02	0.6116		FD-S-051308B	9.42	1.376		4.3 %
Soil	SW6010B	Lead	7439-92-1	mg/kg	HA-20-S-00	15	0.4769	J	FD-051408B	54.8	0.4598	J	114.0 %
Soil	SW6010B-TCLP	Arsenic, TCLP	7440-38-2 TCLP	mg/L	HA-18-S-00	0.043	0.15	U	FD-S-051408	0.043	0.15	U	NC
Soil	SW6010B-TCLP	Barium, TCLP	7440-39-3 TCLP	mg/L	HA-18-S-00	1.01	0.1		FD-S-051408	1.22	0.1		18.8 %
Soil	SW6010B-TCLP	Cadmium, TCLP	7440-43-9 TCLP	mg/L	HA-18-S-00	0.0072	0.05	U	FD-S-051408	0.0072	0.05	U	NC
Soil	SW6010B-TCLP	Chromium, TCLP	7440-47-3 TCLP	mg/L	HA-18-S-00	0.0102	0.1	J	FD-S-051408	0.0116	0.1	J	NC
Soil	SW6010B-TCLP	Lead, TCLP	7439-92-1 TCLP	mg/L	HA-18-S-00	0.037	0.15	U	FD-S-051408	0.037	0.15	U	NC
Soil	SW6010B-TCLP	Selenium, TCLP	7782-49-2 TCLP	mg/L	HA-18-S-00	0.04	0.15	U	FD-S-051408	0.04	0.15	U	NC
Soil	SW6010B-TCLP	Silver, TCLP	7440-22-4 TCLP	mg/L	HA-18-S-00	0.0051	0.1	U	FD-S-051408	0.0051	0.1	U	NC
Soil	SW7470A-TCLP	Mercury, TCLP	7439-97-6 TCLP	mg/L	HA-18-S-00	0.00025	0.002	U	FD-S-051408	0.00025	0.002	U	NC
Soil	SW8260B	1,1,1,2-Tetrachloroethane	630-20-6	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	2.5	2.04	U	NC
Soil	SW8260B	1,1,1-Trichloroethane	71-55-6	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	2.5	2.04	U	NC
Soil	SW8260B	1,1,2,2-Tetrachloroethane	79-34-5	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	2.5	2.04	U	NC
Soil	SW8260B	1,1,2-Trichloroethane	79-00-5	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	2.5	2.04	U	NC
Soil	SW8260B	1,1-Dichloroethane	75-34-3	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	2.5	2.04	U	NC
Soil	SW8260B	1,1-Dichloroethene	75-35-4	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	2.5	2.04	U	NC
Soil	SW8260B	1,1-Dichloropropene	563-58-6	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	2.5	2.04	U	NC

TABLE 5
N and FD Relative Percent Difference Comparison
St. Louis Ordnance Plant, Former Hanley Area, St. Louis, Missouri

Matrix	Method	Analyte	CAS	Units	N	N Result	N RL	N Final Flag	FD	FD Result	FD RL	FD Final Flag	RPD
Soil	SW8260B	1,2,3-Trichlorobenzene	87-61-6	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	1	2.04	J	NC
Soil	SW8260B	1,2,3-Trichloropropane	96-18-4	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	2.5	2.04	U	NC
Soil	SW8260B	1,2,4-Trichlorobenzene	120-82-1	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	2.5	2.04	U	NC
Soil	SW8260B	1,2,4-Trimethylbenzene	95-63-6	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	2.5	2.04	U	NC
Soil	SW8260B	1,2-Dibromo-3-chloropropane	96-12-8	µg/kg	CB-02-S-30	11.8	9.5	U	FD-052108A	12.6	10	U	NC
Soil	SW8260B	1,2-Dibromoethane(EDB)	106-93-4	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	2.5	2.04	U	NC
Soil	SW8260B	1,2-Dichlorobenzene	95-50-1	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	2.5	2.04	U	NC
Soil	SW8260B	1,2-Dichloroethane	107-06-2	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	2.5	2.04	U	NC
Soil	SW8260B	1,2-Dichloropropane	78-87-5	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	2.5	2.04	U	NC
Soil	SW8260B	1,3,5-Trimethylbenzene	108-67-8	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	2.5	2.04	U	NC
Soil	SW8260B	1,3-Dichlorobenzene	541-73-1	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	2.5	2.04	U	NC
Soil	SW8260B	1,3-Dichloropropane	142-28-9	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	2.5	2.04	U	NC
Soil	SW8260B	1,4-Dichlorobenzene	106-46-7	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	2.5	2.04	U	NC
Soil	SW8260B	2,2-Dichloropropane	594-20-7	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	2.5	2.04	U	NC
Soil	SW8260B	2-Butanone	78-93-3	µg/kg	CB-02-S-30	11.8	9.5	U	FD-052108A	12.6	10	U	NC
Soil	SW8260B	2-Chlorotoluene	95-49-8	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	2.5	2.04	U	NC
Soil	SW8260B	2-Hexanone	591-78-6	µg/kg	CB-02-S-30	11.8	9.5	U	FD-052108A	12.6	10	U	NC
Soil	SW8260B	4-Chlorotoluene	106-43-4	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	2.5	2.04	U	NC
Soil	SW8260B	4-Isopropyltoluene	99-87-6	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	2.5	2.04	U	NC
Soil	SW8260B	4-Methyl-2-pentanone	108-10-1	µg/kg	CB-02-S-30	11.8	9.5	U	FD-052108A	12.6	10	U	NC
Soil	SW8260B	Acetone	67-64-1	µg/kg	CB-02-S-30	11.8	9.5	U	FD-052108A	12.6	10	U	NC
Soil	SW8260B	Acrolein	107-02-8	µg/kg	CB-02-S-30	29.4	24	U	FD-052108A	31.4	26	U	NC
Soil	SW8260B	Acrylonitrile	107-13-1	µg/kg	CB-02-S-30	5.9	4.77	U	FD-052108A	6.3	5.15	U	NC
Soil	SW8260B	Benzene	71-43-2	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	2.5	2.04	U	NC
Soil	SW8260B	Bromobenzene	108-86-1	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	2.5	2.04	U	NC
Soil	SW8260B	Bromochloromethane	74-97-5	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	2.5	2.04	U	NC
Soil	SW8260B	Bromodichloromethane	75-27-4	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	2.5	2.04	U	NC
Soil	SW8260B	Bromoform	75-25-2	µg/kg	CB-02-S-30	5.9	4.77	U	FD-052108A	6.3	5.15	U	NC
Soil	SW8260B	Bromomethane	74-83-9	µg/kg	CB-02-S-30	2.4	1.94	UJ	FD-052108A	2.5	2.04	UJ	NC
Soil	SW8260B	Carbon disulfide	75-15-0	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	2.5	2.04	U	NC

TABLE 5
N and FD Relative Percent Difference Comparison
St. Louis Ordnance Plant, Former Hanley Area, St. Louis, Missouri

Matrix	Method	Analyte	CAS	Units	N	N Result	N RL	N Final Flag	FD	FD Result	FD RL	FD Final Flag	RPD
Soil	SW8260B	Carbon tetrachloride	56-23-5	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	2.5	2.04	U	NC
Soil	SW8260B	Chlorobenzene	108-90-7	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	2.5	2.04	U	NC
Soil	SW8260B	Chloroethane	75-00-3	µg/kg	CB-02-S-30	5.9	4.77	UJ	FD-052108A	6.3	5.15	UJ	NC
Soil	SW8260B	Chloroform	67-66-3	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	2.5	2.04	U	NC
Soil	SW8260B	Chloromethane	74-87-3	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	2.5	2.04	U	NC
Soil	SW8260B	cis-1,2-Dichloroethene	156-59-2	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	2.5	2.04	U	NC
Soil	SW8260B	cis-1,3-Dichloropropene	10061-01-5	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	2.5	2.04	U	NC
Soil	SW8260B	Dibromochloromethane	124-48-1	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	2.5	2.04	U	NC
Soil	SW8260B	Dibromomethane	74-95-3	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	2.5	2.04	U	NC
Soil	SW8260B	Dichlorodifluoromethane	75-71-8	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	2.5	2.04	U	NC
Soil	SW8260B	Ethylbenzene	100-41-4	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	2.5	2.04	U	NC
Soil	SW8260B	Hexachlorobutadiene	87-68-3	µg/kg	CB-02-S-30	4.7	3.8	U	FD-052108A	5	4.1	U	NC
Soil	SW8260B	Isopropylbenzene (Cumene)	98-82-8	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	2.5	2.04	U	NC
Soil	SW8260B	Methyl iodide	74-88-4	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	2.5	2.04	U	NC
Soil	SW8260B	Methylene chloride	75-09-2	µg/kg	CB-02-S-30	5.9	4.77	U	FD-052108A	6.3	5.15	U	NC
Soil	SW8260B	MTBE	1634-04-4	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	2.5	2.04	U	NC
Soil	SW8260B	Naphthalene	91-20-3	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	1.4	2.04	J	NC
Soil	SW8260B	n-Butylbenzene	104-51-8	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	2.5	2.04	U	NC
Soil	SW8260B	n-Propylbenzene	103-65-1	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	2.5	2.04	U	NC
Soil	SW8260B	o-Xylene	95-47-6	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	2.5	2.04	U	NC
Soil	SW8260B	p,m-Xylene	108-38-3/1	µg/kg	CB-02-S-30	4.7	3.8	U	FD-052108A	5	4.1	U	NC
Soil	SW8260B	sec-Butylbenzene	135-98-8	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	2.5	2.04	U	NC
Soil	SW8260B	Styrene	100-42-5	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	2.5	2.04	U	NC
Soil	SW8260B	tert-Butylbenzene	98-06-6	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	2.5	2.04	U	NC
Soil	SW8260B	Tetrachloroethene	127-18-4	µg/kg	CB-02-S-30	5.9	4.77	U	FD-052108A	6.3	5.15	U	NC
Soil	SW8260B	Toluene	108-88-3	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	2.5	2.04	U	NC
Soil	SW8260B	trans-1,2-Dichloroethene	156-60-5	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	2.5	2.04	U	NC
Soil	SW8260B	trans-1,3-Dichloropropene	10061-02-6	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	2.5	2.04	U	NC
Soil	SW8260B	Trichloroethene	79-01-6	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	2.5	2.04	U	NC
Soil	SW8260B	Trichlorofluoromethane	75-69-4	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	2.5	2.04	U	NC

TABLE 5
N and FD Relative Percent Difference Comparison
St. Louis Ordnance Plant, Former Hanley Area, St. Louis, Missouri

Matrix	Method	Analyte	CAS	Units	N	N Result	N RL	N Final Flag	FD	FD Result	FD RL	FD Final Flag	RPD
Soil	SW8260B	Vinyl acetate	108-05-4	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	2.5	2.04	U	NC
Soil	SW8260B	Vinyl chloride	75-01-4	µg/kg	CB-02-S-30	2.4	1.94	U	FD-052108A	2.5	2.04	U	NC
Soil	SW8270C	1-Methylnaphthalene	90-12-0	µg/kg	HA-22-S-00	245	197.5	U	FD-051408C	243	196.6	U	NC
Soil	SW8270C	2-Methylnaphthalene	91-57-6	µg/kg	HA-22-S-00	245	197.5	U	FD-051408C	243	196.6	U	NC
Soil	SW8270C	Acenaphthene	83-32-9	µg/kg	HA-22-S-00	245	197.5	U	FD-051408C	243	196.6	U	NC
Soil	SW8270C	Acenaphthylene	208-96-8	µg/kg	HA-22-S-00	245	197.5	U	FD-051408C	243	196.6	U	NC
Soil	SW8270C	Anthracene	120-12-7	µg/kg	HA-22-S-00	48.1	197.5	J	FD-051408C	103	196.6	J	NC
Soil	SW8270C	Benzo(a)anthracene	56-55-3	µg/kg	HA-22-S-00	194	197.5	J	FD-051408C	505	196.6		NC
Soil	SW8270C	Benzo(a)pyrene	50-32-8	µg/kg	HA-22-S-00	179	197.5	J	FD-051408C	475	196.6		NC
Soil	SW8270C	Benzo(b)fluoranthene	205-99-2	µg/kg	HA-22-S-00	203	197.5	J	FD-051408C	604	196.6		NC
Soil	SW8270C	Benzo(g,h,i)perylene	191-24-2	µg/kg	HA-22-S-00	90.1	197.5	J	FD-051408C	242	196.6	J	NC
Soil	SW8270C	Benzo(k)fluoranthene	207-08-9	µg/kg	HA-22-S-00	114	197.5	J	FD-051408C	238	196.6	J	NC
Soil	SW8270C	Chrysene	218-01-9	µg/kg	HA-22-S-00	200	197.5	J	FD-051408C	512	196.6		NC
Soil	SW8270C	Dibenz(a,h)anthracene	53-70-3	µg/kg	HA-22-S-00	245	197.5	U	FD-051408C	65.2	196.6	J	NC
Soil	SW8270C	Fluoranthene	206-44-0	µg/kg	HA-22-S-00	454	197.5		FD-051408C	1140	196.6		86.1 %
Soil	SW8270C	Fluorene	86-73-7	µg/kg	HA-22-S-00	245	197.5	U	FD-051408C	243	196.6	U	NC
Soil	SW8270C	Indeno(1,2,3-cd)pyrene	193-39-5	µg/kg	HA-22-S-00	87.6	197.5	J	FD-051408C	211	196.6	J	NC
Soil	SW8270C	Naphthalene	91-20-3	µg/kg	HA-22-S-00	245	197.5	U	FD-051408C	243	196.6	U	NC
Soil	SW8270C	Phenanthrene	85-01-8	µg/kg	HA-22-S-00	292	197.5		FD-051408C	527	196.6		NC
Soil	SW8270C	Pyrene	129-00-0	µg/kg	HA-22-S-00	322	197.5		FD-051408C	901	196.6		NC
Water	RSK-175	Ethane	74-84-0	µg/L	MW-115-W-00	1.2	1.2	U	FD-W-060508B	1.2	1.2	U	NC
Water	RSK-175	Ethylene	74-85-1	µg/L	MW-115-W-00	1	1	U	FD-W-060508B	1	1	U	NC
Water	RSK-175	Methane	74-82-8	µg/L	MW-115-W-00	2.5	5	U	FD-W-060508B	2.4	5	U	NC
Water	SW300.1	Chloride	CHLORIDE	mg/L	MW-115-W-00	5.13	1		FD-W-060508B	6.42	1		22.3 %
Water	SW300.1	Nitrate	NITRATE	mg/L	MW-115-W-00	0.327	0.1		FD-W-060508B	0.324	0.1		NC
Water	SW300.1	Sulfate	SULFATE	mg/L	MW-115-W-00	15.9	1		FD-W-060508B	15.8	1		0.6 %
Water	SW6010B	Iron	7439-89-6	µg/L	MW-115-W-00	5.5	50	U	FD-W-060508B	5.5	50	U	NC
Water	SW6010B	Manganese	7439-96-5	µg/L	MW-115-W-00	0.35	10	U	FD-W-060508B	0.35	10	U	NC
Water	SW8260B	1,1,1,2-Tetrachloroethane	630-20-6	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	1,1,1,2-Tetrachloroethane	630-20-6	µg/L	MW-115-W-00	1	1	UJ	FD-W-060508A	1	1	UJ	NC

TABLE 5
N and FD Relative Percent Difference Comparison
St. Louis Ordnance Plant, Former Hanley Area, St. Louis, Missouri

Matrix	Method	Analyte	CAS	Units	N	N Result	N RL	N Final Flag	FD	FD Result	FD RL	FD Final Flag	RPD
Water	SW8260B	1,1,1,2-Tetrachloroethane	630-20-6	µg/L	SLOP-6321-5-24	1	1	U	SLOP-6321-5-24-FD	1	1	U	NC
Water	SW8260B	1,1,1-Trichloroethane	71-55-6	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	1,1,1-Trichloroethane	71-55-6	µg/L	MW-115-W-00	1	1	UJ	FD-W-060508A	1	1	UJ	NC
Water	SW8260B	1,1,1-Trichloroethane	71-55-6	µg/L	SLOP-6321-5-24	1	1	U	SLOP-6321-5-24-FD	1	1	U	NC
Water	SW8260B	1,1,2,2-Tetrachloroethane	79-34-5	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	1,1,2,2-Tetrachloroethane	79-34-5	µg/L	MW-115-W-00	1	1	U	FD-W-060508A	1	1	U	NC
Water	SW8260B	1,1,2,2-Tetrachloroethane	79-34-5	µg/L	SLOP-6321-5-24	1	1	U	SLOP-6321-5-24-FD	1	1	U	NC
Water	SW8260B	1,1,2-Trichloroethane	79-00-5	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	1,1,2-Trichloroethane	79-00-5	µg/L	MW-115-W-00	1	1	UJ	FD-W-060508A	1	1	UJ	NC
Water	SW8260B	1,1,2-Trichloroethane	79-00-5	µg/L	SLOP-6321-5-24	1.1	1.1	U	SLOP-6321-5-24-FD	1.1	1.1	U	NC
Water	SW8260B	1,1-Dichloroethane	75-34-3	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	1,1-Dichloroethane	75-34-3	µg/L	MW-115-W-00	1	1	U	FD-W-060508A	1	1	U	NC
Water	SW8260B	1,1-Dichloroethane	75-34-3	µg/L	SLOP-6321-5-24	1	1	U	SLOP-6321-5-24-FD	1	1	U	NC
Water	SW8260B	1,1-Dichloroethene	75-35-4	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	1,1-Dichloroethene	75-35-4	µg/L	MW-115-W-00	1	1	U	FD-W-060508A	1	1	U	NC
Water	SW8260B	1,1-Dichloroethene	75-35-4	µg/L	SLOP-6321-5-24	1	1	U	SLOP-6321-5-24-FD	1	1	U	NC
Water	SW8260B	1,1-Dichloropropene	563-58-6	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	1,1-Dichloropropene	563-58-6	µg/L	MW-115-W-00	1	1	UJ	FD-W-060508A	1	1	UJ	NC
Water	SW8260B	1,1-Dichloropropene	563-58-6	µg/L	SLOP-6321-5-24	1	1	U	SLOP-6321-5-24-FD	1	1	U	NC
Water	SW8260B	1,2,3-Trichlorobenzene	87-61-6	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	1,2,3-Trichlorobenzene	87-61-6	µg/L	MW-115-W-00	1	1	UJ	FD-W-060508A	1	1	UJ	NC
Water	SW8260B	1,2,3-Trichlorobenzene	87-61-6	µg/L	SLOP-6321-5-24	1	1	U	SLOP-6321-5-24-FD	1	1	U	NC
Water	SW8260B	1,2,3-Trichloropropane	96-18-4	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	1,2,3-Trichloropropane	96-18-4	µg/L	MW-115-W-00	1	1	UJ	FD-W-060508A	1	1	UJ	NC
Water	SW8260B	1,2,3-Trichloropropane	96-18-4	µg/L	SLOP-6321-5-24	1.8	1.8	U	SLOP-6321-5-24-FD	1.8	1.8	U	NC
Water	SW8260B	1,2,4-Trichlorobenzene	120-82-1	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	1,2,4-Trichlorobenzene	120-82-1	µg/L	MW-115-W-00	1	1	UJ	FD-W-060508A	1	1	UJ	NC
Water	SW8260B	1,2,4-Trichlorobenzene	120-82-1	µg/L	SLOP-6321-5-24	1	1	U	SLOP-6321-5-24-FD	1	1	U	NC
Water	SW8260B	1,2,4-Trimethylbenzene	95-63-6	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	1,2,4-Trimethylbenzene	95-63-6	µg/L	MW-115-W-00	1	1	UJ	FD-W-060508A	1	1	UJ	NC

TABLE 5
N and FD Relative Percent Difference Comparison
St. Louis Ordnance Plant, Former Hanley Area, St. Louis, Missouri

Matrix	Method	Analyte	CAS	Units	N	N Result	N RL	N Final Flag	FD	FD Result	FD RL	FD Final Flag	RPD
Water	SW8260B	1,2,4-Trimethylbenzene	95-63-6	µg/L	SLOP-6321-5-24	1	1	U	SLOP-6321-5-24-FD	1	1	U	NC
Water	SW8260B	1,2-Dibromo-3-chloropropane	96-12-8	µg/L	MW-113-W-00	2	2	U	FD-W-060408A	2	2	U	NC
Water	SW8260B	1,2-Dibromo-3-chloropropane	96-12-8	µg/L	MW-115-W-00	2	2	UJ	FD-W-060508A	2	2	UJ	NC
Water	SW8260B	1,2-Dibromo-3-chloropropane	96-12-8	µg/L	SLOP-6321-5-24	4	4	U	SLOP-6321-5-24-FD	4	4	U	NC
Water	SW8260B	1,2-Dibromoethane(EDB)	106-93-4	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	1,2-Dibromoethane(EDB)	106-93-4	µg/L	MW-115-W-00	1	1	UJ	FD-W-060508A	1	1	UJ	NC
Water	SW8260B	1,2-Dibromoethane(EDB)	106-93-4	µg/L	SLOP-6321-5-24	1	1	U	SLOP-6321-5-24-FD	1	1	U	NC
Water	SW8260B	1,2-Dichlorobenzene	95-50-1	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	1,2-Dichlorobenzene	95-50-1	µg/L	MW-115-W-00	1	1	UJ	FD-W-060508A	1	1	UJ	NC
Water	SW8260B	1,2-Dichlorobenzene	95-50-1	µg/L	SLOP-6321-5-24	1	1	U	SLOP-6321-5-24-FD	1	1	U	NC
Water	SW8260B	1,2-Dichloroethane	107-06-2	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	1,2-Dichloroethane	107-06-2	µg/L	MW-115-W-00	1	1	U	FD-W-060508A	1	1	U	NC
Water	SW8260B	1,2-Dichloroethane	107-06-2	µg/L	SLOP-6321-5-24	1	1	U	SLOP-6321-5-24-FD	1	1	U	NC
Water	SW8260B	1,2-Dichloropropane	78-87-5	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	1,2-Dichloropropane	78-87-5	µg/L	MW-115-W-00	1	1	U	FD-W-060508A	1	1	U	NC
Water	SW8260B	1,2-Dichloropropane	78-87-5	µg/L	SLOP-6321-5-24	1.1	1.1	U	SLOP-6321-5-24-FD	1.1	1.1	U	NC
Water	SW8260B	1,3,5-Trimethylbenzene	108-67-8	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	1,3,5-Trimethylbenzene	108-67-8	µg/L	MW-115-W-00	1	1	UJ	FD-W-060508A	1	1	UJ	NC
Water	SW8260B	1,3,5-Trimethylbenzene	108-67-8	µg/L	SLOP-6321-5-24	1	1	U	SLOP-6321-5-24-FD	1	1	U	NC
Water	SW8260B	1,3-Dichlorobenzene	541-73-1	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	1,3-Dichlorobenzene	541-73-1	µg/L	MW-115-W-00	1	1	UJ	FD-W-060508A	1	1	UJ	NC
Water	SW8260B	1,3-Dichlorobenzene	541-73-1	µg/L	SLOP-6321-5-24	1	1	U	SLOP-6321-5-24-FD	1	1	U	NC
Water	SW8260B	1,3-Dichloropropane	142-28-9	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	1,3-Dichloropropane	142-28-9	µg/L	MW-115-W-00	1	1	UJ	FD-W-060508A	1	1	UJ	NC
Water	SW8260B	1,3-Dichloropropane	142-28-9	µg/L	SLOP-6321-5-24	1	1	U	SLOP-6321-5-24-FD	1	1	U	NC
Water	SW8260B	1,4-Dichlorobenzene	106-46-7	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	1,4-Dichlorobenzene	106-46-7	µg/L	MW-115-W-00	1	1	UJ	FD-W-060508A	1	1	UJ	NC
Water	SW8260B	1,4-Dichlorobenzene	106-46-7	µg/L	SLOP-6321-5-24	1	1	U	SLOP-6321-5-24-FD	1	1	U	NC
Water	SW8260B	2,2-Dichloropropane	594-20-7	µg/L	MW-113-W-00	1	1	UJ	FD-W-060408A	1	1	UJ	NC
Water	SW8260B	2,2-Dichloropropane	594-20-7	µg/L	MW-115-W-00	1	1	UJ	FD-W-060508A	1	1	UJ	NC

TABLE 5
N and FD Relative Percent Difference Comparison
St. Louis Ordnance Plant, Former Hanley Area, St. Louis, Missouri

Matrix	Method	Analyte	CAS	Units	N	N Result	N RL	N Final Flag	FD	FD Result	FD RL	FD Final Flag	RPD
Water	SW8260B	2,2-Dichloropropane	594-20-7	µg/L	SLOP-6321-5-24	1.1	1.1	U	SLOP-6321-5-24-FD	1.1	1.1	U	NC
Water	SW8260B	2-Butanone	78-93-3	µg/L	MW-113-W-00	10	10	U	FD-W-060408A	10	10	U	NC
Water	SW8260B	2-Butanone	78-93-3	µg/L	MW-115-W-00	10	10	UJ	FD-W-060508A	10	10	UJ	NC
Water	SW8260B	2-Butanone	78-93-3	µg/L	SLOP-6321-5-24	10	10	U	SLOP-6321-5-24-FD	10	10	U	NC
Water	SW8260B	2-Chlorotoluene	95-49-8	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	2-Chlorotoluene	95-49-8	µg/L	MW-115-W-00	1	1	UJ	FD-W-060508A	1	1	UJ	NC
Water	SW8260B	2-Chlorotoluene	95-49-8	µg/L	SLOP-6321-5-24	1	1	U	SLOP-6321-5-24-FD	1	1	U	NC
Water	SW8260B	2-Hexanone	591-78-6	µg/L	MW-113-W-00	5	5	U	FD-W-060408A	5	5	U	NC
Water	SW8260B	2-Hexanone	591-78-6	µg/L	MW-115-W-00	5	5	UJ	FD-W-060508A	5	5	UJ	NC
Water	SW8260B	2-Hexanone	591-78-6	µg/L	SLOP-6321-5-24	5	5	U	SLOP-6321-5-24-FD	5	5	U	NC
Water	SW8260B	4-Chlorotoluene	106-43-4	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	4-Chlorotoluene	106-43-4	µg/L	MW-115-W-00	1	1	UJ	FD-W-060508A	1	1	UJ	NC
Water	SW8260B	4-Chlorotoluene	106-43-4	µg/L	SLOP-6321-5-24	1	1	U	SLOP-6321-5-24-FD	1	1	U	NC
Water	SW8260B	4-Isopropyltoluene	99-87-6	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	4-Isopropyltoluene	99-87-6	µg/L	MW-115-W-00	1	1	UJ	FD-W-060508A	1	1	UJ	NC
Water	SW8260B	4-Isopropyltoluene	99-87-6	µg/L	SLOP-6321-5-24	1	1	U	SLOP-6321-5-24-FD	1	1	U	NC
Water	SW8260B	4-Methyl-2-pentanone	108-10-1	µg/L	MW-113-W-00	5	5	U	FD-W-060408A	5	5	U	NC
Water	SW8260B	4-Methyl-2-pentanone	108-10-1	µg/L	MW-115-W-00	5	5	UJ	FD-W-060508A	5	5	UJ	NC
Water	SW8260B	4-Methyl-2-pentanone	108-10-1	µg/L	SLOP-6321-5-24	5	5	U	SLOP-6321-5-24-FD	5	5	U	NC
Water	SW8260B	Acetone	67-64-1	µg/L	MW-113-W-00	6	10	J	FD-W-060408A	6	10	J	NC
Water	SW8260B	Acetone	67-64-1	µg/L	MW-115-W-00	10.4	10	J	FD-W-060508A	8.8	10	J	NC
Water	SW8260B	Acetone	67-64-1	µg/L	SLOP-6321-5-24	9.2	12	J	SLOP-6321-5-24-FD	9.3	12	J	NC
Water	SW8260B	Acrolein	107-02-8	µg/L	MW-113-W-00	10	10	UJ	FD-W-060408A	10	10	UJ	NC
Water	SW8260B	Acrolein	107-02-8	µg/L	MW-115-W-00	10	10	UJ	FD-W-060508A	10	10	UJ	NC
Water	SW8260B	Acrolein	107-02-8	µg/L	SLOP-6321-5-24	10	10	UJ	SLOP-6321-5-24-FD	10	10	UJ	NC
Water	SW8260B	Acrylonitrile	107-13-1	µg/L	MW-113-W-00	4	4	U	FD-W-060408A	4	4	U	NC
Water	SW8260B	Acrylonitrile	107-13-1	µg/L	MW-115-W-00	4	4	UJ	FD-W-060508A	4	4	UJ	NC
Water	SW8260B	Acrylonitrile	107-13-1	µg/L	SLOP-6321-5-24	4	4	U	SLOP-6321-5-24-FD	4	4	U	NC
Water	SW8260B	Benzene	71-43-2	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	Benzene	71-43-2	µg/L	MW-115-W-00	1	1	UJ	FD-W-060508A	1	1	UJ	NC

TABLE 5
N and FD Relative Percent Difference Comparison
St. Louis Ordnance Plant, Former Hanley Area, St. Louis, Missouri

Matrix	Method	Analyte	CAS	Units	N	N Result	N RL	N Final Flag	FD	FD Result	FD RL	FD Final Flag	RPD
Water	SW8260B	Benzene	71-43-2	µg/L	SLOP-6321-5-24	1	1	U	SLOP-6321-5-24-FD	1	1	U	NC
Water	SW8260B	Bromobenzene	108-86-1	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	Bromobenzene	108-86-1	µg/L	MW-115-W-00	1	1	UJ	FD-W-060508A	1	1	UJ	NC
Water	SW8260B	Bromobenzene	108-86-1	µg/L	SLOP-6321-5-24	1	1	U	SLOP-6321-5-24-FD	1	1	U	NC
Water	SW8260B	Bromochloromethane	74-97-5	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	Bromochloromethane	74-97-5	µg/L	MW-115-W-00	1	1	UJ	FD-W-060508A	1	1	UJ	NC
Water	SW8260B	Bromochloromethane	74-97-5	µg/L	SLOP-6321-5-24	1.5	1.5	U	SLOP-6321-5-24-FD	1.5	1.5	U	NC
Water	SW8260B	Bromodichloromethane	75-27-4	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	Bromodichloromethane	75-27-4	µg/L	MW-115-W-00	1	1	UJ	FD-W-060508A	1	1	UJ	NC
Water	SW8260B	Bromodichloromethane	75-27-4	µg/L	SLOP-6321-5-24	1	1	U	SLOP-6321-5-24-FD	1	1	U	NC
Water	SW8260B	Bromoform	75-25-2	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	Bromoform	75-25-2	µg/L	MW-115-W-00	1	1	U	FD-W-060508A	1	1	U	NC
Water	SW8260B	Bromoform	75-25-2	µg/L	SLOP-6321-5-24	1.2	1.2	U	SLOP-6321-5-24-FD	1.2	1.2	U	NC
Water	SW8260B	Bromomethane	74-83-9	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	Bromomethane	74-83-9	µg/L	MW-115-W-00	1	1	UJ	FD-W-060508A	1	1	UJ	NC
Water	SW8260B	Bromomethane	74-83-9	µg/L	SLOP-6321-5-24	1	1	U	SLOP-6321-5-24-FD	1	1	U	NC
Water	SW8260B	Carbon disulfide	75-15-0	µg/L	MW-113-W-00	0.53	1	J	FD-W-060408A	0.59	1	J	NC
Water	SW8260B	Carbon disulfide	75-15-0	µg/L	MW-115-W-00	1	1	UJ	FD-W-060508A	1	1	UJ	NC
Water	SW8260B	Carbon disulfide	75-15-0	µg/L	SLOP-6321-5-24	1	1	U	SLOP-6321-5-24-FD	1	1	U	NC
Water	SW8260B	Carbon tetrachloride	56-23-5	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	Carbon tetrachloride	56-23-5	µg/L	MW-115-W-00	0.43	1	J	FD-W-060508A	0.38	1	J	NC
Water	SW8260B	Carbon tetrachloride	56-23-5	µg/L	SLOP-6321-5-24	1	1	U	SLOP-6321-5-24-FD	1	1	U	NC
Water	SW8260B	Chlorobenzene	108-90-7	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	Chlorobenzene	108-90-7	µg/L	MW-115-W-00	1	1	U	FD-W-060508A	1	1	U	NC
Water	SW8260B	Chlorobenzene	108-90-7	µg/L	SLOP-6321-5-24	1	1	U	SLOP-6321-5-24-FD	1	1	U	NC
Water	SW8260B	Chloroethane	75-00-3	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	Chloroethane	75-00-3	µg/L	MW-115-W-00	1	1	UJ	FD-W-060508A	1	1	UJ	NC
Water	SW8260B	Chloroethane	75-00-3	µg/L	SLOP-6321-5-24	1.9	1.9	U	SLOP-6321-5-24-FD	1.9	1.9	U	NC
Water	SW8260B	Chloroform	67-66-3	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	Chloroform	67-66-3	µg/L	MW-115-W-00	1	1	U	FD-W-060508A	1	1	U	NC

TABLE 5
N and FD Relative Percent Difference Comparison
St. Louis Ordnance Plant, Former Hanley Area, St. Louis, Missouri

Matrix	Method	Analyte	CAS	Units	N	N Result	N RL	N Final Flag	FD	FD Result	FD RL	FD Final Flag	RPD
Water	SW8260B	Chloroform	67-66-3	µg/L	SLOP-6321-5-24	1	1	U	SLOP-6321-5-24-FD	1	1	U	NC
Water	SW8260B	Chloromethane	74-87-3	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	Chloromethane	74-87-3	µg/L	MW-115-W-00	1	1	U	FD-W-060508A	1	1	U	NC
Water	SW8260B	Chloromethane	74-87-3	µg/L	SLOP-6321-5-24	1	1	U	SLOP-6321-5-24-FD	1	1	U	NC
Water	SW8260B	cis-1,2-Dichloroethene	156-59-2	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	cis-1,2-Dichloroethene	156-59-2	µg/L	MW-115-W-00	1	1	U	FD-W-060508A	1	1	U	NC
Water	SW8260B	cis-1,2-Dichloroethene	156-59-2	µg/L	SLOP-6321-5-24	1	1	U	SLOP-6321-5-24-FD	1	1	U	NC
Water	SW8260B	cis-1,3-Dichloropropene	10061-01-5	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	cis-1,3-Dichloropropene	10061-01-5	µg/L	MW-115-W-00	1	1	UJ	FD-W-060508A	1	1	UJ	NC
Water	SW8260B	cis-1,3-Dichloropropene	10061-01-5	µg/L	SLOP-6321-5-24	1	1	U	SLOP-6321-5-24-FD	1	1	U	NC
Water	SW8260B	Dibromochloromethane	124-48-1	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	Dibromochloromethane	124-48-1	µg/L	MW-115-W-00	1	1	UJ	FD-W-060508A	1	1	UJ	NC
Water	SW8260B	Dibromochloromethane	124-48-1	µg/L	SLOP-6321-5-24	1	1	U	SLOP-6321-5-24-FD	1	1	U	NC
Water	SW8260B	Dibromomethane	74-95-3	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	Dibromomethane	74-95-3	µg/L	MW-115-W-00	1	1	UJ	FD-W-060508A	1	1	UJ	NC
Water	SW8260B	Dibromomethane	74-95-3	µg/L	SLOP-6321-5-24	1	1	U	SLOP-6321-5-24-FD	1	1	U	NC
Water	SW8260B	Dichlorodifluoromethane	75-71-8	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	Dichlorodifluoromethane	75-71-8	µg/L	MW-115-W-00	1	1	UJ	FD-W-060508A	1	1	UJ	NC
Water	SW8260B	Dichlorodifluoromethane	75-71-8	µg/L	SLOP-6321-5-24	1.1	1.1	U	SLOP-6321-5-24-FD	1.1	1.1	U	NC
Water	SW8260B	Ethylbenzene	100-41-4	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	Ethylbenzene	100-41-4	µg/L	MW-115-W-00	1	1	U	FD-W-060508A	1	1	U	NC
Water	SW8260B	Ethylbenzene	100-41-4	µg/L	SLOP-6321-5-24	1	1	U	SLOP-6321-5-24-FD	1	1	U	NC
Water	SW8260B	Hexachlorobutadiene	87-68-3	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	Hexachlorobutadiene	87-68-3	µg/L	MW-115-W-00	1	1	UJ	FD-W-060508A	1	1	UJ	NC
Water	SW8260B	Hexachlorobutadiene	87-68-3	µg/L	SLOP-6321-5-24	1.8	1.8	U	SLOP-6321-5-24-FD	1.8	1.8	U	NC
Water	SW8260B	Isopropylbenzene (Cumene)	98-82-8	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	Isopropylbenzene (Cumene)	98-82-8	µg/L	MW-115-W-00	1	1	UJ	FD-W-060508A	1	1	UJ	NC
Water	SW8260B	Isopropylbenzene (Cumene)	98-82-8	µg/L	SLOP-6321-5-24	1	1	U	SLOP-6321-5-24-FD	1	1	U	NC
Water	SW8260B	Methyl iodide	74-88-4	µg/L	MW-113-W-00	2	2	U	FD-W-060408A	2	2	U	NC
Water	SW8260B	Methyl iodide	74-88-4	µg/L	MW-115-W-00	2	2	UJ	FD-W-060508A	2	2	UJ	NC

TABLE 5
N and FD Relative Percent Difference Comparison
St. Louis Ordnance Plant, Former Hanley Area, St. Louis, Missouri

Matrix	Method	Analyte	CAS	Units	N	N Result	N RL	N Final Flag	FD	FD Result	FD RL	FD Final Flag	RPD
Water	SW8260B	Methyl iodide	74-88-4	µg/L	SLOP-6321-5-24	2	2	U	SLOP-6321-5-24-FD	2	2	U	NC
Water	SW8260B	Methylene chloride	75-09-2	µg/L	MW-113-W-00	0.56	1	U	FD-W-060408A	1	1	R	NC
Water	SW8260B	Methylene chloride	75-09-2	µg/L	MW-115-W-00	1	1	UJ	FD-W-060508A	1	1	UJ	NC
Water	SW8260B	Methylene chloride	75-09-2	µg/L	SLOP-6321-5-24	1	1	U	SLOP-6321-5-24-FD	1	1	U	NC
Water	SW8260B	MTBE	1634-04-4	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	MTBE	1634-04-4	µg/L	MW-115-W-00	1	1	UJ	FD-W-060508A	1	1	UJ	NC
Water	SW8260B	MTBE	1634-04-4	µg/L	SLOP-6321-5-24	1	1	U	SLOP-6321-5-24-FD	1	1	U	NC
Water	SW8260B	Naphthalene	91-20-3	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	Naphthalene	91-20-3	µg/L	MW-115-W-00	1	1	UJ	FD-W-060508A	1	1	UJ	NC
Water	SW8260B	Naphthalene	91-20-3	µg/L	SLOP-6321-5-24	1	1	U	SLOP-6321-5-24-FD	1	1	U	NC
Water	SW8260B	n-Butylbenzene	104-51-8	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	n-Butylbenzene	104-51-8	µg/L	MW-115-W-00	1	1	UJ	FD-W-060508A	1	1	UJ	NC
Water	SW8260B	n-Butylbenzene	104-51-8	µg/L	SLOP-6321-5-24	1	1	U	SLOP-6321-5-24-FD	1	1	U	NC
Water	SW8260B	n-Propylbenzene	103-65-1	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	n-Propylbenzene	103-65-1	µg/L	MW-115-W-00	1	1	UJ	FD-W-060508A	1	1	UJ	NC
Water	SW8260B	n-Propylbenzene	103-65-1	µg/L	SLOP-6321-5-24	1	1	U	SLOP-6321-5-24-FD	1	1	U	NC
Water	SW8260B	o-Xylene	95-47-6	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	o-Xylene	95-47-6	µg/L	MW-115-W-00	1	1	UJ	FD-W-060508A	1	1	UJ	NC
Water	SW8260B	o-Xylene	95-47-6	µg/L	SLOP-6321-5-24	1	1	U	SLOP-6321-5-24-FD	1	1	U	NC
Water	SW8260B	p,m-Xylene	108-38-3/1	µg/L	MW-113-W-00	2	2	U	FD-W-060408A	2	2	U	NC
Water	SW8260B	p,m-Xylene	108-38-3/1	µg/L	MW-115-W-00	2	2	UJ	FD-W-060508A	2	2	UJ	NC
Water	SW8260B	p,m-Xylene	108-38-3/1	µg/L	SLOP-6321-5-24	2	2	U	SLOP-6321-5-24-FD	2	2	U	NC
Water	SW8260B	sec-Butylbenzene	135-98-8	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	sec-Butylbenzene	135-98-8	µg/L	MW-115-W-00	1	1	UJ	FD-W-060508A	1	1	UJ	NC
Water	SW8260B	sec-Butylbenzene	135-98-8	µg/L	SLOP-6321-5-24	1	1	U	SLOP-6321-5-24-FD	1	1	U	NC
Water	SW8260B	Styrene	100-42-5	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	Styrene	100-42-5	µg/L	MW-115-W-00	1	1	UJ	FD-W-060508A	1	1	UJ	NC
Water	SW8260B	Styrene	100-42-5	µg/L	SLOP-6321-5-24	1	1	U	SLOP-6321-5-24-FD	1	1	U	NC
Water	SW8260B	tert-Butylbenzene	98-06-6	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	tert-Butylbenzene	98-06-6	µg/L	MW-115-W-00	1	1	UJ	FD-W-060508A	1	1	UJ	NC

TABLE 5
N and FD Relative Percent Difference Comparison
St. Louis Ordnance Plant, Former Hanley Area, St. Louis, Missouri

Matrix	Method	Analyte	CAS	Units	N	N Result	N RL	N Final Flag	FD	FD Result	FD RL	FD Final Flag	RPD
Water	SW8260B	tert-Butylbenzene	98-06-6	µg/L	SLOP-6321-5-24	1	1	U	SLOP-6321-5-24-FD	1	1	U	NC
Water	SW8260B	Tetrachloroethene	127-18-4	µg/L	MW-113-W-00	0.81	1	J	FD-W-060408A	0.88	1	J	NC
Water	SW8260B	Tetrachloroethene	127-18-4	µg/L	MW-115-W-00	1	1	U	FD-W-060508A	1	1	U	NC
Water	SW8260B	Tetrachloroethene	127-18-4	µg/L	SLOP-6321-5-24	1.1	1.1	U	SLOP-6321-5-24-FD	1.1	1.1	U	NC
Water	SW8260B	Toluene	108-88-3	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	Toluene	108-88-3	µg/L	MW-115-W-00	1	1	U	FD-W-060508A	1	1	U	NC
Water	SW8260B	Toluene	108-88-3	µg/L	SLOP-6321-5-24	1	1	U	SLOP-6321-5-24-FD	1	1	U	NC
Water	SW8260B	trans-1,2-Dichloroethene	156-60-5	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	trans-1,2-Dichloroethene	156-60-5	µg/L	MW-115-W-00	1	1	U	FD-W-060508A	1	1	U	NC
Water	SW8260B	trans-1,2-Dichloroethene	156-60-5	µg/L	SLOP-6321-5-24	1	1	U	SLOP-6321-5-24-FD	1	1	U	NC
Water	SW8260B	trans-1,3-Dichloropropene	10061-02-6	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	trans-1,3-Dichloropropene	10061-02-6	µg/L	MW-115-W-00	1	1	UJ	FD-W-060508A	1	1	UJ	NC
Water	SW8260B	trans-1,3-Dichloropropene	10061-02-6	µg/L	SLOP-6321-5-24	1	1	U	SLOP-6321-5-24-FD	1	1	U	NC
Water	SW8260B	Trichloroethene	79-01-6	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	Trichloroethene	79-01-6	µg/L	MW-115-W-00	1	1	U	FD-W-060508A	1	1	U	NC
Water	SW8260B	Trichloroethene	79-01-6	µg/L	SLOP-6321-5-24	1	1	U	SLOP-6321-5-24-FD	1	1	U	NC
Water	SW8260B	Trichlorofluoromethane	75-69-4	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	Trichlorofluoromethane	75-69-4	µg/L	MW-115-W-00	1	1	UJ	FD-W-060508A	1	1	UJ	NC
Water	SW8260B	Trichlorofluoromethane	75-69-4	µg/L	SLOP-6321-5-24	1	1	U	SLOP-6321-5-24-FD	1	1	U	NC
Water	SW8260B	Vinyl acetate	108-05-4	µg/L	MW-113-W-00	2	2	UJ	FD-W-060408A	2	2	UJ	NC
Water	SW8260B	Vinyl acetate	108-05-4	µg/L	MW-115-W-00	2	2	UJ	FD-W-060508A	2	2	UJ	NC
Water	SW8260B	Vinyl acetate	108-05-4	µg/L	SLOP-6321-5-24	2	2	U	SLOP-6321-5-24-FD	2	2	U	NC
Water	SW8260B	Vinyl chloride	75-01-4	µg/L	MW-113-W-00	1	1	U	FD-W-060408A	1	1	U	NC
Water	SW8260B	Vinyl chloride	75-01-4	µg/L	MW-115-W-00	1	1	U	FD-W-060508A	1	1	U	NC
Water	SW8260B	Vinyl chloride	75-01-4	µg/L	SLOP-6321-5-24	1	1	U	SLOP-6321-5-24-FD	1	1	U	NC

FD = Field Duplicate
N = Normal
NC = Not Calculable
RL = Reporting Limit
RPD = Relative Percent Difference
Shading = RPD exceeds control limit
µg/L = microgram per liter

The U.S. Army Corps of Engineers-Kansas City District Data Validation Guidelines defines when matrix influences may be significant. A range around the compound screening level is calculated based upon the sample result, the screening level, the percent recovery, and the RPD of the MS/MSD pair. If the sample result falls within the range, the matrix influence is considered significant. All sample results with MS/MSD qualifications were evaluated by this guidance. MS/MSD recoveries and the associated RPD met all criteria, with the following exceptions:

- For method SW6010B in soil, the MS and/or the MSD percent recovery was below the lower control limit for lead. For this matrix and method combination, 4.0 percent of the results were qualified as estimated detected results.
- For method SW8260B in soil, the MS and/or the MSD percent recovery was below the lower control limit for 1,1,2,2-tetrachloroethane, 1,2-dibromo-3-chloropropane, 2-butanone, acrolein, methylene chloride, and naphthalene. For this matrix and method combination, 1.2 percent of the results were qualified as estimated nondetected results.
- For method SW8260B in water, the MS and/or the MSD percent recovery was below the lower control limit for 1,2,3-trichloropropane, 1,2,4-trichlorobenzene, 1,2-dichloroethane, 2,2-dichloropropane, dichlorodifluoromethane, methylene chloride, styrene, and vinyl acetate. For this matrix and method combination, 0.1 percent of the results were qualified as estimated detected results, 0.4 percent of the results were qualified as estimated nondetected results.
- For method SW8260B in soil, the MS/MSD relative percent difference was above the upper control limit for 2-butanone, acetone, acrolein, bromomethane, hexachlorobutadiene, and methylene chloride. For this matrix and method combination, 1.2 percent of the results were qualified as estimated nondetected results.
- For method SW8260B in water, the MS/MSD relative percent difference was above the upper control limit for chloromethane, naphthalene, and vinyl acetate. For this matrix and method combination, 0.2 percent of the results were qualified as estimated nondetected results.

Serial Dilution

Serial dilutions were analyzed, as required, and met all QAPP criteria.

Chain of Custody

Each sample was documented in a completed chain of custody and received at the laboratory in good condition. There were minor changes to field sample identifications that were well-documented in the laboratory reports.

Overall Assessment

The goal of this assessment is to demonstrate that a sufficient number of representative samples were collected and the resulting analytical data can be used to support the decisionmaking process. The procedures for assessing the precision, accuracy,

representativeness, completeness, and comparability parameters (PARCC) were based on the approved QAPP. The following summarizes the PARCC findings:

1. Overall, this project is 99.8 percent complete. For method SW7470A-TCLP in soil, 100.0 percent of the mercury results were qualified as rejected results due to holding-time exceedances. These method/matrix/analyte combinations did not meet the completeness goal stated in the QAPP (90 percent).
2. Initial and continuing calibration exceedances were observed for method SW8260B, resulting in data qualified as estimated.
3. Method blanks and field blanks were free of contamination with minor exceptions noted. The affected data were qualified as nondetect and flagged "U" at the measured concentration. Approximately 0.6 percent of the sample data were qualified due to blank contamination. Systematic errors were not apparent.
4. Surrogate exceedances were observed for method E300.1 in water, and method SW8260B in soil, resulting in data qualified as estimated.
5. LCS/LCSD recovery and RPD exceedances were observed for method SW8260B in soil and water, resulting in data qualified as estimated.
6. FD RPD exceedances were observed for method SW6010B in soil and method TO15 SIM in air, resulting in data qualified as estimated.
7. MS/MSD recovery and RPD exceedances were observed for method SW6010B in soil and method SW8260B in soil and water, resulting in data qualified as estimated.
8. A soil FD was not collected for methods SW6010B-TCLP and SW7470A-TCLP. A water FD was not collected for methods E150.1, SM2540B, SM2540D, SM2540E, and SM5220C. Field precision cannot be assessed for these matrix/method combinations.
9. A soil MS/MSD pair was not collected for methods SW6010B-TCLP, SW7470A, and SW7470A-TCLP. A water MS/MSD pair was not collected for methods E150.1, RSK-175, SM2540B, SM2540D, SM2540E, SM5220C, E300.1, and SW6010B. Field precision and matrix effects cannot be assessed for these matrix/method combinations.
10. The precision and accuracy of the data, as measured by field and laboratory QC indicators, suggest that the project goals have been met and the data are acceptable for project decisionmaking as qualified.

TABLE 7
Verification Findings
St. Louis Ordnance Plant, Former Hanley Area, St. Louis, Missouri

Matrix	Method	Analyte	Sample ID	Result	Units	Validation Reason	Final Validation Flag
Air	TO15 SIM	TCE	SLOP-6317-IA-SW	1.1	µg/m ³	FD>RPD	J
Air	TO15 SIM	TCE	SLOP-6317-IA-SW-FD	0.52	µg/m ³	FD>RPD	J
Air	TO15 SIM	Tetrachloroethylene	SLOP-6317-IA-NE	0.25	µg/m ³	LB<RL	U
Air	TO15 SIM	Tetrachloroethylene	SLOP-6317-IA-SW	0.91	µg/m ³	FD>RPD	J
Air	TO15 SIM	Tetrachloroethylene	SLOP-6317-IA-SW-FD	0.44	µg/m ³	FD>RPD	J
Soil	SW6010B	Lead	FD-051408B	15	mg/kg	FD>RPD	J
Soil	SW6010B	Lead	HA-20-S-00	54.8	mg/kg	FD>RPD	J
Soil	SW6010B	Lead	HA-21-S-00	31	mg/kg	SD<LCL	J
Soil	SW6010B	Lead	HA-22-S-00	65	mg/kg	MS<LCL	J
Soil	SW6010B	Lead	HA-22-S-00	65	mg/kg	SD<LCL	J
Soil	SW7470A-TCLP	Mercury, TCLP	HA-05-S-00	0.00025	mg/L	HTa>UCL	R
Soil	SW7470A-TCLP	Mercury, TCLP	HA-06-S-00	0.00025	mg/L	HTa>UCL	R
Soil	SW7470A-TCLP	Mercury, TCLP	HA-11-S-00	0.00025	mg/L	HTa>UCL	R
Soil	SW7470A-TCLP	Mercury, TCLP	HA-13-S-00	0.00025	mg/L	HTa>UCL	R
Soil	SW7470A-TCLP	Mercury, TCLP	HA-15-S-00	0.00025	mg/L	HTa>UCL	R
Soil	SW8260B	1,1,2,2-Tetrachloroethane	CB-06-S-21.5	2.4	µg/kg	MS<LCL	UJ
Soil	SW8260B	1,1,2,2-Tetrachloroethane	CB-06-S-21.5	2.4	µg/kg	SD<LCL	UJ
Soil	SW8260B	1,2-Dibromo-3-chloropropane	CB-06-S-21.5	12	µg/kg	SD<LCL	UJ
Soil	SW8260B	2-Butanone	CB-06-S-21.5	12	µg/kg	MSRPD	UJ
Soil	SW8260B	2-Butanone	CB-06-S-21.5	12	µg/kg	SD<LCL	UJ
Soil	SW8260B	4-Methyl-2-pentanone	CB-07-S-2	2.4	µg/kg	LCS>UCL	J
Soil	SW8260B	Acetone	CB-06-S-21.5	12	µg/kg	MSRPD	UJ
Soil	SW8260B	Acrolein	CB-06-S-21.5	30.1	µg/kg	LCSRPD	UJ

TABLE 7

Verification Findings

St. Louis Ordnance Plant, Former Hanley Area, St. Louis, Missouri

Matrix	Method	Analyte	Sample ID	Result	Units	Validation Reason	Final Validation Flag
Soil	SW8260B	Acrolein	CB-06-S-21.5	30.1	µg/kg	MSRPD	UJ
Soil	SW8260B	Acrolein	CB-06-S-21.5	30.1	µg/kg	SD<LCL	UJ
Soil	SW8260B	Bromomethane	CB-02-S-30	2.5	µg/kg	LCSRPD	UJ
Soil	SW8260B	Bromomethane	CB-06-S-21.5	2.4	µg/kg	MSRPD	UJ
Soil	SW8260B	Bromomethane	FD-052108A	2.4	µg/kg	LCSRPD	UJ
Soil	SW8260B	Carbon tetrachloride	CB-01-S-30	27300	µg/kg	>ICLinearRange	J
Soil	SW8260B	Chloroethane	CB-02-S-30	6.3	µg/kg	LCS<LCL	UJ
Soil	SW8260B	Chloroethane	CB-02-S-30	6.3	µg/kg	LCSRPD	UJ
Soil	SW8260B	Chloroethane	FD-052108A	5.9	µg/kg	LCS<LCL	UJ
Soil	SW8260B	Chloroethane	FD-052108A	5.9	µg/kg	LCSRPD	UJ
Soil	SW8260B	Dibromomethane	CB-07-S-2	2.7	µg/kg	LCSRPD	UJ
Soil	SW8260B	Hexachlorobutadiene	CB-06-S-21.5	4.8	µg/kg	MSRPD	UJ
Soil	SW8260B	Methylene chloride	CB-03-S-8	6	µg/kg	LCS<LCL	UJ
Soil	SW8260B	Methylene chloride	CB-04-S-19	6	µg/kg	LCS<LCL	UJ
Soil	SW8260B	Methylene chloride	CB-06-S-21.5	6	µg/kg	LCS<LCL	UJ
Soil	SW8260B	Methylene chloride	CB-06-S-21.5	6	µg/kg	MS<LCL	UJ
Soil	SW8260B	Methylene chloride	CB-06-S-21.5	6	µg/kg	MSRPD	UJ
Soil	SW8260B	Methylene chloride	CB-06-S-21.5	6	µg/kg	SD<LCL	UJ
Soil	SW8260B	Methylene chloride	CB-07-S-2	6.8	µg/kg	LCS<LCL	UJ
Soil	SW8260B	Naphthalene	CB-06-S-21.5	2.4	µg/kg	SD<LCL	UJ
Soil	SW8260B	Tetrachloroethene	CB-06-S-21.5	2.8	µg/kg	Sur>UCL	J
Soil	SW8270C	Fluoranthene	FD-051408C	454	µg/kg	FD>RPD	J
Soil	SW8270C	Fluoranthene	HA-22-S-00	1140	µg/kg	FD>RPD	J

TABLE 7
Verification Findings
St. Louis Ordnance Plant, Former Hanley Area, St. Louis, Missouri

Matrix	Method	Analyte	Sample ID	Result	Units	Validation Reason	Final Validation Flag
Water	RSK-175	Methane	FD-W-060508B	2.5	µg/L	LB<RL	U
Water	RSK-175	Methane	MW-107-W-00	3	µg/L	LB<RL	U
Water	RSK-175	Methane	MW-110-W-00	2.7	µg/L	LB<RL	U
Water	RSK-175	Methane	MW-111-W-00	2.2	µg/L	LB<RL	U
Water	RSK-175	Methane	MW-115-W-00	2.4	µg/L	LB<RL	U
Water	SM5220C	Chemical Oxygen Demand	Disposal - 1	62	mg/L	LB<RL	U
Water	SM5220C	Chemical Oxygen Demand	Disposal - 2	20	mg/L	LB<RL	U
Water	SW300.1	Sulfate	MW-111-W-00	101	mg/L	Sur<LCL	J
Water	SW8260B	1,1,1,2-Tetrachloroethane	FD-W-060508A	1	µg/L	NoCAL	UJ
Water	SW8260B	1,1,1,2-Tetrachloroethane	MW-107-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	1,1,1,2-Tetrachloroethane	MW-110-W-00	20	µg/L	NoCAL	UJ
Water	SW8260B	1,1,1,2-Tetrachloroethane	MW-112-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	1,1,1,2-Tetrachloroethane	MW-115-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	1,1,1-Trichloroethane	FD-W-060508A	1	µg/L	NoCAL	UJ
Water	SW8260B	1,1,1-Trichloroethane	MW-107-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	1,1,1-Trichloroethane	MW-110-W-00	20	µg/L	NoCAL	UJ
Water	SW8260B	1,1,1-Trichloroethane	MW-112-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	1,1,1-Trichloroethane	MW-115-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	1,1,2-Trichloroethane	FD-W-060508A	1	µg/L	NoCAL	UJ
Water	SW8260B	1,1,2-Trichloroethane	MW-107-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	1,1,2-Trichloroethane	MW-110-W-00	20	µg/L	NoCAL	UJ
Water	SW8260B	1,1,2-Trichloroethane	MW-112-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	1,1,2-Trichloroethane	MW-115-W-00	1	µg/L	NoCAL	UJ

TABLE 7

Verification Findings

St. Louis Ordnance Plant, Former Hanley Area, St. Louis, Missouri

Matrix	Method	Analyte	Sample ID	Result	Units	Validation Reason	Final Validation Flag
Water	SW8260B	1,1-Dichloroethene	MW-116-W-00	1	µg/L	LCS<LCL	UJ
Water	SW8260B	1,1-Dichloropropene	FD-W-060508A	1	µg/L	NoCAL	UJ
Water	SW8260B	1,1-Dichloropropene	MW-107-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	1,1-Dichloropropene	MW-110-W-00	20	µg/L	NoCAL	UJ
Water	SW8260B	1,1-Dichloropropene	MW-112-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	1,1-Dichloropropene	MW-115-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	1,2,3-Trichlorobenzene	FD-W-060508A	1	µg/L	NoCAL	UJ
Water	SW8260B	1,2,3-Trichlorobenzene	MW-107-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	1,2,3-Trichlorobenzene	MW-110-W-00	20	µg/L	NoCAL	UJ
Water	SW8260B	1,2,3-Trichlorobenzene	MW-112-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	1,2,3-Trichlorobenzene	MW-115-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	1,2,3-Trichloropropane	CB-04-W-27.5	1	µg/L	MS<LCL	UJ
Water	SW8260B	1,2,3-Trichloropropane	FD-W-060508A	1	µg/L	NoCAL	UJ
Water	SW8260B	1,2,3-Trichloropropane	MW-107-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	1,2,3-Trichloropropane	MW-110-W-00	20	µg/L	NoCAL	UJ
Water	SW8260B	1,2,3-Trichloropropane	MW-112-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	1,2,3-Trichloropropane	MW-115-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	1,2,3-Trichloropropane	MW-117-W-00	1	µg/L	LCS<LCL	UJ
Water	SW8260B	1,2,3-Trichloropropane	MW-117-W-00	1	µg/L	LCSRPD	UJ
Water	SW8260B	1,2,4-Trichlorobenzene	FD-W-060508A	1	µg/L	NoCAL	UJ
Water	SW8260B	1,2,4-Trichlorobenzene	MW-107-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	1,2,4-Trichlorobenzene	MW-108-W-00	1	µg/L	MS<LCL	UJ
Water	SW8260B	1,2,4-Trichlorobenzene	MW-110-W-00	20	µg/L	NoCAL	UJ

TABLE 7
 Verification Findings
St. Louis Ordnance Plant, Former Hanley Area, St. Louis, Missouri

Matrix	Method	Analyte	Sample ID	Result	Units	Validation Reason	Final Validation Flag
Water	SW8260B	1,2,4-Trichlorobenzene	MW-112-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	1,2,4-Trichlorobenzene	MW-115-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	1,2,4-Trimethylbenzene	FD-W-060508A	1	µg/L	NoCAL	UJ
Water	SW8260B	1,2,4-Trimethylbenzene	MW-107-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	1,2,4-Trimethylbenzene	MW-110-W-00	20	µg/L	NoCAL	UJ
Water	SW8260B	1,2,4-Trimethylbenzene	MW-112-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	1,2,4-Trimethylbenzene	MW-115-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	1,2-Dibromo-3-chloropropane	FD-W-060508A	2	µg/L	NoCAL	UJ
Water	SW8260B	1,2-Dibromo-3-chloropropane	MW-107-W-00	2	µg/L	NoCAL	UJ
Water	SW8260B	1,2-Dibromo-3-chloropropane	MW-110-W-00	40	µg/L	NoCAL	UJ
Water	SW8260B	1,2-Dibromo-3-chloropropane	MW-112-W-00	2	µg/L	NoCAL	UJ
Water	SW8260B	1,2-Dibromo-3-chloropropane	MW-115-W-00	2	µg/L	NoCAL	UJ
Water	SW8260B	1,2-Dibromoethane(EDB)	FD-W-060508A	1	µg/L	NoCAL	UJ
Water	SW8260B	1,2-Dibromoethane(EDB)	MW-107-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	1,2-Dibromoethane(EDB)	MW-110-W-00	20	µg/L	NoCAL	UJ
Water	SW8260B	1,2-Dibromoethane(EDB)	MW-112-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	1,2-Dibromoethane(EDB)	MW-115-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	1,2-Dichlorobenzene	FD-W-060508A	1	µg/L	NoCAL	UJ
Water	SW8260B	1,2-Dichlorobenzene	MW-107-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	1,2-Dichlorobenzene	MW-110-W-00	20	µg/L	NoCAL	UJ
Water	SW8260B	1,2-Dichlorobenzene	MW-112-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	1,2-Dichlorobenzene	MW-115-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	1,2-Dichloroethane	CB-04-W-27.5	189	µg/L	MS<LCL	J

TABLE 7

Verification Findings

St. Louis Ordnance Plant, Former Hanley Area, St. Louis, Missouri

Matrix	Method	Analyte	Sample ID	Result	Units	Validation Reason	Final Validation Flag
Water	SW8260B	1,2-Dichloroethane	CB-04-W-27.5	189	µg/L	SD<LCL	J
Water	SW8260B	1,3,5-Trimethylbenzene	FD-W-060508A	1	µg/L	NoCAL	UJ
Water	SW8260B	1,3,5-Trimethylbenzene	MW-107-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	1,3,5-Trimethylbenzene	MW-110-W-00	20	µg/L	NoCAL	UJ
Water	SW8260B	1,3,5-Trimethylbenzene	MW-112-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	1,3,5-Trimethylbenzene	MW-115-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	1,3-Dichlorobenzene	FD-W-060508A	1	µg/L	NoCAL	UJ
Water	SW8260B	1,3-Dichlorobenzene	MW-107-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	1,3-Dichlorobenzene	MW-110-W-00	20	µg/L	NoCAL	UJ
Water	SW8260B	1,3-Dichlorobenzene	MW-112-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	1,3-Dichlorobenzene	MW-115-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	1,3-Dichloropropane	FD-W-060508A	1	µg/L	NoCAL	UJ
Water	SW8260B	1,3-Dichloropropane	MW-107-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	1,3-Dichloropropane	MW-110-W-00	20	µg/L	NoCAL	UJ
Water	SW8260B	1,3-Dichloropropane	MW-112-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	1,3-Dichloropropane	MW-115-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	1,4-Dichlorobenzene	FD-W-060508A	1	µg/L	NoCAL	UJ
Water	SW8260B	1,4-Dichlorobenzene	MW-107-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	1,4-Dichlorobenzene	MW-110-W-00	20	µg/L	NoCAL	UJ
Water	SW8260B	1,4-Dichlorobenzene	MW-112-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	1,4-Dichlorobenzene	MW-115-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	2,2-Dichloropropane	FD-W-060408A	1	µg/L	CCV>UCL	UJ
Water	SW8260B	2,2-Dichloropropane	FD-W-060408A	1	µg/L	LCS<LCL	UJ

TABLE 7

Verification Findings

St. Louis Ordnance Plant, Former Hanley Area, St. Louis, Missouri

Matrix	Method	Analyte	Sample ID	Result	Units	Validation Reason	Final Validation Flag
Water	SW8260B	2,2-Dichloropropane	FD-W-060508A	1	µg/L	NoCAL	UJ
Water	SW8260B	2,2-Dichloropropane	MW-106-W-00	1	µg/L	CCV>UCL	UJ
Water	SW8260B	2,2-Dichloropropane	MW-106-W-00	1	µg/L	LCS<LCL	UJ
Water	SW8260B	2,2-Dichloropropane	MW-107-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	2,2-Dichloropropane	MW-108-W-00	1	µg/L	CCV>UCL	UJ
Water	SW8260B	2,2-Dichloropropane	MW-108-W-00	1	µg/L	LCS<LCL	UJ
Water	SW8260B	2,2-Dichloropropane	MW-108-W-00	1	µg/L	MS<LCL	UJ
Water	SW8260B	2,2-Dichloropropane	MW-108-W-00	1	µg/L	SD<LCL	UJ
Water	SW8260B	2,2-Dichloropropane	MW-109-W-00	1	µg/L	CCV>UCL	UJ
Water	SW8260B	2,2-Dichloropropane	MW-109-W-00	1	µg/L	LCS<LCL	UJ
Water	SW8260B	2,2-Dichloropropane	MW-110-W-00	20	µg/L	NoCAL	UJ
Water	SW8260B	2,2-Dichloropropane	MW-112-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	2,2-Dichloropropane	MW-113-W-00	1	µg/L	CCV>UCL	UJ
Water	SW8260B	2,2-Dichloropropane	MW-113-W-00	1	µg/L	LCS<LCL	UJ
Water	SW8260B	2,2-Dichloropropane	MW-114-W	1	µg/L	CCV>UCL	UJ
Water	SW8260B	2,2-Dichloropropane	MW-114-W	1	µg/L	LCS<LCL	UJ
Water	SW8260B	2,2-Dichloropropane	MW-115-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	2,2-Dichloropropane	MW-116-W-00	1	µg/L	CCV>UCL	UJ
Water	SW8260B	2-Butanone	FD-W-060508A	10	µg/L	NoCAL	UJ
Water	SW8260B	2-Butanone	MW-107-W-00	10	µg/L	NoCAL	UJ
Water	SW8260B	2-Butanone	MW-110-W-00	200	µg/L	NoCAL	UJ
Water	SW8260B	2-Butanone	MW-112-W-00	10	µg/L	NoCAL	UJ
Water	SW8260B	2-Butanone	MW-115-W-00	10	µg/L	NoCAL	UJ

TABLE 7

Verification Findings

St. Louis Ordnance Plant, Former Hanley Area, St. Louis, Missouri

Matrix	Method	Analyte	Sample ID	Result	Units	Validation Reason	Final Validation Flag
Water	SW8260B	2-Butanone	MW-117-W-00	10	µg/L	LCS<LCL	UJ
Water	SW8260B	2-Chlorotoluene	FD-W-060508A	1	µg/L	NoCAL	UJ
Water	SW8260B	2-Chlorotoluene	MW-107-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	2-Chlorotoluene	MW-110-W-00	20	µg/L	NoCAL	UJ
Water	SW8260B	2-Chlorotoluene	MW-112-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	2-Chlorotoluene	MW-115-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	2-Hexanone	FD-W-060508A	5	µg/L	NoCAL	UJ
Water	SW8260B	2-Hexanone	MW-107-W-00	5	µg/L	NoCAL	UJ
Water	SW8260B	2-Hexanone	MW-110-W-00	100	µg/L	NoCAL	UJ
Water	SW8260B	2-Hexanone	MW-112-W-00	5	µg/L	NoCAL	UJ
Water	SW8260B	2-Hexanone	MW-115-W-00	5	µg/L	NoCAL	UJ
Water	SW8260B	4-Chlorotoluene	FD-W-060508A	1	µg/L	NoCAL	UJ
Water	SW8260B	4-Chlorotoluene	MW-107-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	4-Chlorotoluene	MW-110-W-00	20	µg/L	NoCAL	UJ
Water	SW8260B	4-Chlorotoluene	MW-112-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	4-Chlorotoluene	MW-115-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	4-Isopropyltoluene	FD-W-060508A	1	µg/L	NoCAL	UJ
Water	SW8260B	4-Isopropyltoluene	MW-107-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	4-Isopropyltoluene	MW-110-W-00	20	µg/L	NoCAL	UJ
Water	SW8260B	4-Isopropyltoluene	MW-112-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	4-Isopropyltoluene	MW-115-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	4-Methyl-2-pentanone	FD-W-060508A	5	µg/L	NoCAL	UJ
Water	SW8260B	4-Methyl-2-pentanone	MW-107-W-00	5	µg/L	NoCAL	UJ

TABLE 7
Verification Findings
St. Louis Ordnance Plant, Former Hanley Area, St. Louis, Missouri

Matrix	Method	Analyte	Sample ID	Result	Units	Validation Reason	Final Validation Flag
Water	SW8260B	4-Methyl-2-pentanone	MW-110-W-00	100	µg/L	NoCAL	UJ
Water	SW8260B	4-Methyl-2-pentanone	MW-112-W-00	5	µg/L	NoCAL	UJ
Water	SW8260B	4-Methyl-2-pentanone	MW-115-W-00	5	µg/L	NoCAL	UJ
Water	SW8260B	Acetone	FD-W-060508A	10.4	µg/L	NoCAL	J
Water	SW8260B	Acetone	MW-107-W-00	10	µg/L	NoCAL	UJ
Water	SW8260B	Acetone	MW-110-W-00	200	µg/L	NoCAL	UJ
Water	SW8260B	Acetone	MW-112-W-00	10	µg/L	NoCAL	UJ
Water	SW8260B	Acetone	MW-115-W-00	8.8	µg/L	NoCAL	J
Water	SW8260B	Acetone	MW-117-W-00	10	µg/L	CCV>UCL	UJ
Water	SW8260B	Acrolein	FD-W-060408A	10	µg/L	IC RRF	UJ
Water	SW8260B	Acrolein	FD-W-060508A	10	µg/L	NoCAL	UJ
Water	SW8260B	Acrolein	MW-106-W-00	10	µg/L	IC RRF	UJ
Water	SW8260B	Acrolein	MW-107-W-00	10	µg/L	NoCAL	UJ
Water	SW8260B	Acrolein	MW-108-W-00	10	µg/L	IC RRF	UJ
Water	SW8260B	Acrolein	MW-109-W-00	10	µg/L	IC RRF	UJ
Water	SW8260B	Acrolein	MW-110-W-00	200	µg/L	NoCAL	UJ
Water	SW8260B	Acrolein	MW-112-W-00	10	µg/L	NoCAL	UJ
Water	SW8260B	Acrolein	MW-113-W-00	10	µg/L	IC RRF	UJ
Water	SW8260B	Acrolein	MW-114-W	10	µg/L	IC RRF	UJ
Water	SW8260B	Acrolein	MW-115-W-00	10	µg/L	NoCAL	UJ
Water	SW8260B	Acrolein	MW-116-W-00	10	µg/L	IC RRF	UJ
Water	SW8260B	Acrolein	MW-117-W-00	10	µg/L	CCV>UCL	UJ
Water	SW8260B	Acrolein	MW-117-W-00	10	µg/L	IC RRF	UJ

TABLE 7

Verification Findings

St. Louis Ordnance Plant, Former Hanley Area, St. Louis, Missouri

Matrix	Method	Analyte	Sample ID	Result	Units	Validation Reason	Final Validation Flag
Water	SW8260B	Acrolein	MW-117-W-00	10	µg/L	LCS<LCL	UJ
Water	SW8260B	Acrolein	SLOP-4701-5-22	10	µg/L	CCV<RF	UJ
Water	SW8260B	Acrolein	SLOP-4701-5-22	10	µg/L	IC RRF	UJ
Water	SW8260B	Acrolein	SLOP-6317-5-25	10	µg/L	CCV<RF	UJ
Water	SW8260B	Acrolein	SLOP-6317-5-25	10	µg/L	IC RRF	UJ
Water	SW8260B	Acrolein	SLOP-6321-5-24	10	µg/L	CCV<RF	UJ
Water	SW8260B	Acrolein	SLOP-6321-5-24	10	µg/L	IC RRF	UJ
Water	SW8260B	Acrolein	SLOP-6321-5-24-FD	10	µg/L	CCV<RF	UJ
Water	SW8260B	Acrolein	SLOP-6321-5-24-FD	10	µg/L	IC RRF	UJ
Water	SW8260B	Acrolein	SLOPVI-033108	10	µg/L	CCV<RF	UJ
Water	SW8260B	Acrolein	SLOPVI-033108	10	µg/L	IC RRF	UJ
Water	SW8260B	Acrylonitrile	FD-W-060508A	4	µg/L	NoCAL	UJ
Water	SW8260B	Acrylonitrile	MW-107-W-00	4	µg/L	NoCAL	UJ
Water	SW8260B	Acrylonitrile	MW-110-W-00	80	µg/L	NoCAL	UJ
Water	SW8260B	Acrylonitrile	MW-112-W-00	4	µg/L	NoCAL	UJ
Water	SW8260B	Acrylonitrile	MW-115-W-00	4	µg/L	NoCAL	UJ
Water	SW8260B	Benzene	FD-W-060508A	1	µg/L	NoCAL	UJ
Water	SW8260B	Benzene	MW-107-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	Benzene	MW-110-W-00	20	µg/L	NoCAL	UJ
Water	SW8260B	Benzene	MW-112-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	Benzene	MW-115-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	Bromobenzene	FD-W-060508A	1	µg/L	NoCAL	UJ
Water	SW8260B	Bromobenzene	MW-107-W-00	1	µg/L	NoCAL	UJ

TABLE 7
 Verification Findings
St. Louis Ordnance Plant, Former Hanley Area, St. Louis, Missouri

Matrix	Method	Analyte	Sample ID	Result	Units	Validation Reason	Final Validation Flag
Water	SW8260B	Bromobenzene	MW-110-W-00	20	µg/L	NoCAL	UJ
Water	SW8260B	Bromobenzene	MW-112-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	Bromobenzene	MW-115-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	Bromochloromethane	FD-W-060508A	1	µg/L	NoCAL	UJ
Water	SW8260B	Bromochloromethane	MW-107-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	Bromochloromethane	MW-110-W-00	20	µg/L	NoCAL	UJ
Water	SW8260B	Bromochloromethane	MW-112-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	Bromochloromethane	MW-115-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	Bromodichloromethane	FD-W-060508A	1	µg/L	NoCAL	UJ
Water	SW8260B	Bromodichloromethane	MW-107-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	Bromodichloromethane	MW-110-W-00	20	µg/L	NoCAL	UJ
Water	SW8260B	Bromodichloromethane	MW-112-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	Bromodichloromethane	MW-115-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	Bromomethane	FD-W-060508A	1	µg/L	NoCAL	UJ
Water	SW8260B	Bromomethane	MW-107-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	Bromomethane	MW-110-W-00	20	µg/L	NoCAL	UJ
Water	SW8260B	Bromomethane	MW-112-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	Bromomethane	MW-115-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	Bromomethane	MW-116-W-00	1	µg/L	LCSRPD	UJ
Water	SW8260B	Carbon disulfide	FD-W-060508A	1	µg/L	NoCAL	UJ
Water	SW8260B	Carbon disulfide	MW-107-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	Carbon disulfide	MW-110-W-00	20	µg/L	NoCAL	UJ
Water	SW8260B	Carbon disulfide	MW-112-W-00	1	µg/L	NoCAL	UJ

TABLE 7

Verification Findings

St. Louis Ordnance Plant, Former Hanley Area, St. Louis, Missouri

Matrix	Method	Analyte	Sample ID	Result	Units	Validation Reason	Final Validation Flag
Water	SW8260B	Carbon disulfide	MW-115-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	Carbon disulfide	MW-116-W-00	1	µg/L	LCSRPD	UJ
Water	SW8260B	Carbon tetrachloride	CB-01-W-30	4160	µg/L	>ICLinearRange	J
Water	SW8260B	Carbon tetrachloride	FD-W-060508A	0.43	µg/L	NoCAL	J
Water	SW8260B	Carbon tetrachloride	MW-107-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	Carbon tetrachloride	MW-110-W-00	20	µg/L	NoCAL	UJ
Water	SW8260B	Carbon tetrachloride	MW-112-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	Carbon tetrachloride	MW-115-W-00	0.38	µg/L	NoCAL	J
Water	SW8260B	Carbon tetrachloride	MW-116-W-00	1	µg/L	LCSRPD	UJ
Water	SW8260B	Chloroethane	FD-W-060508A	1	µg/L	NoCAL	UJ
Water	SW8260B	Chloroethane	MW-107-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	Chloroethane	MW-110-W-00	20	µg/L	NoCAL	UJ
Water	SW8260B	Chloroethane	MW-112-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	Chloroethane	MW-115-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	Chloromethane	MW-108-W-00	1	µg/L	MSRPD	UJ
Water	SW8260B	Chloromethane	MW-116-W-00	1	µg/L	LCSRPD	UJ
Water	SW8260B	cis-1,3-Dichloropropene	FD-W-060508A	1	µg/L	NoCAL	UJ
Water	SW8260B	cis-1,3-Dichloropropene	MW-107-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	cis-1,3-Dichloropropene	MW-110-W-00	20	µg/L	NoCAL	UJ
Water	SW8260B	cis-1,3-Dichloropropene	MW-112-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	cis-1,3-Dichloropropene	MW-115-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	Dibromochloromethane	FD-W-060508A	1	µg/L	NoCAL	UJ
Water	SW8260B	Dibromochloromethane	MW-107-W-00	1	µg/L	NoCAL	UJ

TABLE 7

Verification Findings

St. Louis Ordnance Plant, Former Hanley Area, St. Louis, Missouri

Matrix	Method	Analyte	Sample ID	Result	Units	Validation Reason	Final Validation Flag
Water	SW8260B	Dibromochloromethane	MW-110-W-00	20	µg/L	NoCAL	UJ
Water	SW8260B	Dibromochloromethane	MW-112-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	Dibromochloromethane	MW-115-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	Dibromomethane	FD-W-060508A	1	µg/L	NoCAL	UJ
Water	SW8260B	Dibromomethane	MW-107-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	Dibromomethane	MW-110-W-00	20	µg/L	NoCAL	UJ
Water	SW8260B	Dibromomethane	MW-112-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	Dibromomethane	MW-115-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	Dichlorodifluoromethane	Disposal - 1	1.7	µg/L	LCSRPD	UJ
Water	SW8260B	Dichlorodifluoromethane	Disposal - 2	1.7	µg/L	LCSRPD	UJ
Water	SW8260B	Dichlorodifluoromethane	FD-W-060508A	1	µg/L	NoCAL	UJ
Water	SW8260B	Dichlorodifluoromethane	MW-107-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	Dichlorodifluoromethane	MW-108-W-00	1	µg/L	MS<LCL	UJ
Water	SW8260B	Dichlorodifluoromethane	MW-108-W-00	1	µg/L	SD<LCL	UJ
Water	SW8260B	Dichlorodifluoromethane	MW-110-W-00	20	µg/L	NoCAL	UJ
Water	SW8260B	Dichlorodifluoromethane	MW-112-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	Dichlorodifluoromethane	MW-115-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	Dichlorodifluoromethane	MW-116-W-00	1	µg/L	LCSRPD	UJ
Water	SW8260B	Dichlorodifluoromethane	MW-117-W-00	1	µg/L	CCV>UCL	UJ
Water	SW8260B	Hexachlorobutadiene	FD-W-060508A	1	µg/L	NoCAL	UJ
Water	SW8260B	Hexachlorobutadiene	MW-107-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	Hexachlorobutadiene	MW-110-W-00	20	µg/L	NoCAL	UJ
Water	SW8260B	Hexachlorobutadiene	MW-112-W-00	1	µg/L	NoCAL	UJ

TABLE 7

Verification Findings

St. Louis Ordnance Plant, Former Hanley Area, St. Louis, Missouri

Matrix	Method	Analyte	Sample ID	Result	Units	Validation Reason	Final Validation Flag
Water	SW8260B	Hexachlorobutadiene	MW-115-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	Hexachlorobutadiene	MW-116-W-00	1	µg/L	LCSRPD	UJ
Water	SW8260B	Hexachlorobutadiene	MW-117-W-00	1	µg/L	LCSRPD	UJ
Water	SW8260B	Isopropylbenzene (Cumene)	FD-W-060508A	1	µg/L	NoCAL	UJ
Water	SW8260B	Isopropylbenzene (Cumene)	MW-107-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	Isopropylbenzene (Cumene)	MW-110-W-00	20	µg/L	NoCAL	UJ
Water	SW8260B	Isopropylbenzene (Cumene)	MW-112-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	Isopropylbenzene (Cumene)	MW-115-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	Methyl iodide	FD-W-060508A	2	µg/L	NoCAL	UJ
Water	SW8260B	Methyl iodide	MW-107-W-00	2	µg/L	NoCAL	UJ
Water	SW8260B	Methyl iodide	MW-110-W-00	40	µg/L	NoCAL	UJ
Water	SW8260B	Methyl iodide	MW-112-W-00	2	µg/L	NoCAL	UJ
Water	SW8260B	Methyl iodide	MW-115-W-00	2	µg/L	NoCAL	UJ
Water	SW8260B	Methyl iodide	MW-116-W-00	1.2	µg/L	LCSRPD	J
Water	SW8260B	Methylene chloride	FD-W-060408A	0.56	µg/L	LB>RL	U
Water	SW8260B	Methylene chloride	FD-W-060408A	0.56	µg/L	TB>RL	U
Water	SW8260B	Methylene chloride	FD-W-060508A	1	µg/L	NoCAL	UJ
Water	SW8260B	Methylene chloride	MW-106-W-00	0.54	µg/L	LB>RL	U
Water	SW8260B	Methylene chloride	MW-106-W-00	0.54	µg/L	TB>RL	U
Water	SW8260B	Methylene chloride	MW-107-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	Methylene chloride	MW-108-W-00	0.53	µg/L	LB>RL	U
Water	SW8260B	Methylene chloride	MW-108-W-00	0.53	µg/L	MS<LCL	U
Water	SW8260B	Methylene chloride	MW-108-W-00	0.53	µg/L	SD<LCL	U

TABLE 7
Verification Findings
St. Louis Ordnance Plant, Former Hanley Area, St. Louis, Missouri

Matrix	Method	Analyte	Sample ID	Result	Units	Validation Reason	Final Validation Flag
Water	SW8260B	Methylene chloride	MW-108-W-00	0.53	µg/L	TB>RL	U
Water	SW8260B	Methylene chloride	MW-110-W-00	20	µg/L	NoCAL	UJ
Water	SW8260B	Methylene chloride	MW-112-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	Methylene chloride	MW-115-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	MTBE	FD-W-060508A	1	µg/L	NoCAL	UJ
Water	SW8260B	MTBE	MW-107-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	MTBE	MW-110-W-00	20	µg/L	NoCAL	UJ
Water	SW8260B	MTBE	MW-112-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	MTBE	MW-115-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	Naphthalene	CB-04-W-27.5	1	µg/L	MSRPD	UJ
Water	SW8260B	Naphthalene	FD-W-060508A	1	µg/L	NoCAL	UJ
Water	SW8260B	Naphthalene	MW-107-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	Naphthalene	MW-110-W-00	20	µg/L	NoCAL	UJ
Water	SW8260B	Naphthalene	MW-112-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	Naphthalene	MW-115-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	Naphthalene	MW-117-W-00	1	µg/L	LCSRPD	UJ
Water	SW8260B	n-Butylbenzene	FD-W-060508A	1	µg/L	NoCAL	UJ
Water	SW8260B	n-Butylbenzene	MW-107-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	n-Butylbenzene	MW-110-W-00	20	µg/L	NoCAL	UJ
Water	SW8260B	n-Butylbenzene	MW-112-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	n-Butylbenzene	MW-115-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	n-Propylbenzene	FD-W-060508A	1	µg/L	NoCAL	UJ
Water	SW8260B	n-Propylbenzene	MW-107-W-00	1	µg/L	NoCAL	UJ

TABLE 7

Verification Findings

St. Louis Ordnance Plant, Former Hanley Area, St. Louis, Missouri

Matrix	Method	Analyte	Sample ID	Result	Units	Validation Reason	Final Validation Flag
Water	SW8260B	n-Propylbenzene	MW-110-W-00	20	µg/L	NoCAL	UJ
Water	SW8260B	n-Propylbenzene	MW-112-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	n-Propylbenzene	MW-115-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	o-Xylene	FD-W-060508A	1	µg/L	NoCAL	UJ
Water	SW8260B	o-Xylene	MW-107-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	o-Xylene	MW-110-W-00	20	µg/L	NoCAL	UJ
Water	SW8260B	o-Xylene	MW-112-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	o-Xylene	MW-115-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	o-Xylene	MW-117-W-00	1	µg/L	LCSRPD	UJ
Water	SW8260B	p,m-Xylene	FD-W-060508A	2	µg/L	NoCAL	UJ
Water	SW8260B	p,m-Xylene	MW-107-W-00	2	µg/L	NoCAL	UJ
Water	SW8260B	p,m-Xylene	MW-110-W-00	40	µg/L	NoCAL	UJ
Water	SW8260B	p,m-Xylene	MW-112-W-00	2	µg/L	NoCAL	UJ
Water	SW8260B	p,m-Xylene	MW-115-W-00	2	µg/L	NoCAL	UJ
Water	SW8260B	sec-Butylbenzene	FD-W-060508A	1	µg/L	NoCAL	UJ
Water	SW8260B	sec-Butylbenzene	MW-107-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	sec-Butylbenzene	MW-110-W-00	20	µg/L	NoCAL	UJ
Water	SW8260B	sec-Butylbenzene	MW-112-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	sec-Butylbenzene	MW-115-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	Styrene	FD-W-060508A	1	µg/L	NoCAL	UJ
Water	SW8260B	Styrene	MW-107-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	Styrene	MW-108-W-00	1	µg/L	MS<LCL	UJ
Water	SW8260B	Styrene	MW-108-W-00	1	µg/L	SD<LCL	UJ

TABLE 7
Verification Findings
St. Louis Ordnance Plant, Former Hanley Area, St. Louis, Missouri

Matrix	Method	Analyte	Sample ID	Result	Units	Validation Reason	Final Validation Flag
Water	SW8260B	Styrene	MW-110-W-00	20	µg/L	NoCAL	UJ
Water	SW8260B	Styrene	MW-112-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	Styrene	MW-115-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	tert-Butylbenzene	FD-W-060508A	1	µg/L	NoCAL	UJ
Water	SW8260B	tert-Butylbenzene	MW-107-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	tert-Butylbenzene	MW-110-W-00	20	µg/L	NoCAL	UJ
Water	SW8260B	tert-Butylbenzene	MW-112-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	tert-Butylbenzene	MW-115-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	trans-1,3-Dichloropropene	FD-W-060508A	1	µg/L	NoCAL	UJ
Water	SW8260B	trans-1,3-Dichloropropene	MW-107-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	trans-1,3-Dichloropropene	MW-110-W-00	20	µg/L	NoCAL	UJ
Water	SW8260B	trans-1,3-Dichloropropene	MW-112-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	trans-1,3-Dichloropropene	MW-115-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	Trichlorofluoromethane	FD-W-060508A	1	µg/L	NoCAL	UJ
Water	SW8260B	Trichlorofluoromethane	MW-107-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	Trichlorofluoromethane	MW-110-W-00	20	µg/L	NoCAL	UJ
Water	SW8260B	Trichlorofluoromethane	MW-112-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	Trichlorofluoromethane	MW-115-W-00	1	µg/L	NoCAL	UJ
Water	SW8260B	Trichlorofluoromethane	MW-116-W-00	1	µg/L	LCSRPD	UJ
Water	SW8260B	Vinyl acetate	FD-W-060408A	2	µg/L	CCV>UCL	UJ
Water	SW8260B	Vinyl acetate	FD-W-060508A	2	µg/L	NoCAL	UJ
Water	SW8260B	Vinyl acetate	MW-106-W-00	2	µg/L	CCV>UCL	UJ
Water	SW8260B	Vinyl acetate	MW-107-W-00	2	µg/L	NoCAL	UJ

TABLE 7

Verification Findings

St. Louis Ordnance Plant, Former Hanley Area, St. Louis, Missouri

Matrix	Method	Analyte	Sample ID	Result	Units	Validation Reason	Final Validation Flag
Water	SW8260B	Vinyl acetate	MW-108-W-00	2	µg/L	CCV>UCL	UJ
Water	SW8260B	Vinyl acetate	MW-108-W-00	2	µg/L	MS<LCL	UJ
Water	SW8260B	Vinyl acetate	MW-108-W-00	2	µg/L	MSRPD	UJ
Water	SW8260B	Vinyl acetate	MW-108-W-00	2	µg/L	SD<LCL	UJ
Water	SW8260B	Vinyl acetate	MW-109-W-00	2	µg/L	CCV>UCL	UJ
Water	SW8260B	Vinyl acetate	MW-110-W-00	40	µg/L	NoCAL	UJ
Water	SW8260B	Vinyl acetate	MW-112-W-00	2	µg/L	NoCAL	UJ
Water	SW8260B	Vinyl acetate	MW-113-W-00	2	µg/L	CCV>UCL	UJ
Water	SW8260B	Vinyl acetate	MW-114-W	2	µg/L	CCV>UCL	UJ
Water	SW8260B	Vinyl acetate	MW-115-W-00	2	µg/L	NoCAL	UJ
Water	SW8260B	Vinyl acetate	MW-116-W-00	2	µg/L	CCV>UCL	UJ
Water	SW8260B	Vinyl chloride	MW-116-W-00	1	µg/L	LCSRPD	UJ

TABLE 8

Verification Reason Code Descriptions

St. Louis Ordnance Plant, Former Hanley Area, St. Louis, Missouri

Verification Reason Code	Reason Code Description
>ICLinearRange	Result greater than linear calibration range
CCV<RF	Continuing calibration response factor below the lower control limit
CCV>UCL	Continuing calibration recovery greater than upper control limit
FD>RPD	Field duplicate exceeds RPD criteria
HTa>UCL	Holding time exceeded
IC RRF	Initial calibration relative response factor below lower control limit
LB<RL	Laboratory blank contamination less than the RL
LB>RL	Laboratory blank contamination greater than the RL
LCS<LCL	LCS recovery less than lower control limit
LCS>UCL	LCS recovery greater than upper control limit
LCSRPD	LCS/LCSD RPD criteria exceeded
MS<LCL	Matrix spike recovery less than lower control limit
MSRPD	Matrix spike RPD criteria exceedance
NoCAL	No calibration analyzed in the analytical batch
SD<LCL	Matrix spike duplicate recovery criteria less than lower control limit
Sur<LCL	Surrogate recovery less than lower control limit
Sur>UCL	Surrogate recovery greater than upper control limit
TB>RL	Trip blank concentration greater than the RL

June 10, 2008
Project No. SG15-4302

David Lee
CH2M Hill
727 North 1st Street, Suite 400
St. Louis, Missouri 63102

Subject: Geotechnical Laboratory Testing
SLOP R1
St. Louis, Missouri

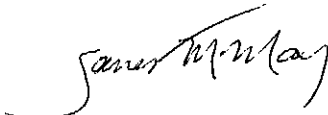
Dear Mr. Lee:

Please find the attached results of geotechnical tests performed on five Shelby tube samples provided to Shively Geotechnical, Inc. by your office. Samples were submitted for particle size analysis and hydraulic conductivity testing.

Testing was performed in accordance with the American Society for Testing and Materials (ASTM) test methods D 422 - particle size analysis of soils and D 5084 - hydraulic conductivity. Hydraulic conductivity results can be found on the attached Test Results data sheets and summary table. Particle size results are on the Grain Size Distribution Curves.

We appreciate the opportunity to be of service to CH2M Hill. Please call me if you have any questions or if we can be of additional assistance.

Sincerely,



Janet M. May
Technical Services Manager

Attachments

**SUMMARY OF
LABORATORY TEST RESULTS
FOR
CH2MHILL**

**Site:
SLOP R1
4301 GOODFELLOW BOULEVARD
ST. LOUIS, MISSOURI**

Sample Identification	Sample Depth, (Feet)	Moisture Content, %	Dry Unit Weight, pcf	Hydraulic Conductivity, cm/sec	Average Hydraulic Gradient
CB-02-S-3	3.0 - 5.0	24.7	97.6	2.3×10^{-7}	1.4
CB-05-S-12	12.0 - 14.0	25.6	98.3	1.2×10^{-6}	1.4
CB-05-S-17	17.0 - 19.0	23.6	101.0	3.1×10^{-5}	0.8
CB-06-S-13	13.0 - 15.0	26.8	96.2	1.5×10^{-6}	0.9
CB-06-S-20	20.0 - 22.0	27.3	95.3	1.5×10^{-7}	1.4

% - Percent


cm/sec - Centimeters per Second

pcf - Pounds per cubic foot

Vj
Vme

June 10, 2008
Project No. SG15-4302
Shively Geotechnical, Inc.

HYDRAULIC CONDUCTIVITY TEST RESULTS



PROJECT DATA

Date Sampled:	May 21, 2008	Sample Number:	CB-02-S-3
Project Number:	SG15-4302	Sample Depth:	3.0 - 5.0 Feet
Project Name:	SLOP R1	Sample Type:	Shelby Tube
Project Location:	4301 Goodfellow Blvd. St. Louis, Missouri	Test Start Date:	May 28, 2008
		Test Method:	ASTM D 5084

TEST SPECIMEN DATA

Initial Data:		Final Data:	
Length:	3.886 inches		
Diameter:	2.806 inches		
Sample Weight:	768.0 grams		
Dry Unit Weight:	97.6 pcf		
Moisture Content:	24.7 percent	Moisture Content:	25.6 percent

FLOW DATA

Permeant Liquid	Tap Water	Cell Pressure, psi	43
Temperature, °C	20	Inflow Pressure, psi	40
		Outflow Pressure, psi	40
B Value (Prior to permeation):	96%	Average Hydraulic Gradient	1.4

Hydraulic Conductivity

(cm/sec)

Test Interval 1	2.6E-07
Test Interval 2	1.8E-07
Test Interval 3	2.7E-07
Test Interval 4	2.1E-07

Average k	2.3E-07
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HYDRAULIC CONDUCTIVITY TEST RESULTS



PROJECT DATA

Date Sampled:	May 27, 2008	Sample Number:	CB-05-S-12
Project Number:	SG15-4302	Sample Depth:	12.0 - 14.0 Feet
Project Name:	SLOP R1	Sample Type:	Shelby Tube
Project Location:	4301 Goodfellow Blvd. St. Louis, Missouri	Test Start Date:	May 28, 2008
		Test Method:	ASTM D 5084

TEST SPECIMEN DATA

Initial Data:		Final Data:	
Length:	3.709 inches		
Diameter:	2.863 inches		
Sample Weight:	773.8 grams		
Dry Unit Weight:	98.3 pcf		
Moisture Content:	25.6 percent	Moisture Content:	26.1 percent

FLOW DATA

Permeant Liquid	Tap Water	Cell Pressure, psi	33
Temperature, °C	20	Inflow Pressure, psi	30
		Outflow Pressure, psi	30
B Value (Prior to permeation):	97%	Average Hydraulic Gradient	1.4

Hydraulic Conductivity (cm/sec)

Test Interval 1	1.3E-06
Test Interval 2	1.2E-06
Test Interval 3	1.2E-06
Test Interval 4	1.1E-06

Average k	1.2E-06
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HYDRAULIC CONDUCTIVITY TEST RESULTS

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v MIC

PROJECT DATA

Date Sampled:	May 27, 2008	Sample Number:	CB-05-S-17
Project Number:	SG15-4302	Sample Depth:	17.0 - 19.0 Feet
Project Name:	SLOP R1	Sample Type:	Shelby Tube
Project Location:	4301 Goodfellow Blvd. St. Louis, Missouri	Test Start Date:	May 28, 2008
		Test Method:	ASTM D 5084

TEST SPECIMEN DATA

Initial Data:		Final Data:	
Length:	3.175 inches		
Diameter:	2.847 inches		
Sample Weight:	662.5 grams		
Dry Unit Weight:	101.0 pcf		
Moisture Content:	23.6 percent	Moisture Content:	24.3 percent

FLOW DATA

Permeant Liquid	Tap Water	Cell Pressure, psi	33
Temperature, °C	20	Inflow Pressure, psi	30
		Outflow Pressure, psi	30
B Value (Prior to permeation):	97%	Average Hydraulic Gradient	0.8

Hydraulic Conductivity (cm/sec)

Test Interval 1	3.2E-05
Test Interval 2	3.1E-05
Test Interval 3	3.1E-05
Test Interval 4	3.0E-05

Average k	3.1E-05
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HYDRAULIC CONDUCTIVITY TEST RESULTS



PROJECT DATA

Date Sampled:	May 23, 2008	Sample Number:	CB-06-S-13
Project Number:	SG15-4302	Sample Depth:	13.0 - 15.0 Feet
Project Name:	SLOP R1	Sample Type:	Shelby Tube
Project Location:	4301 Goodfellow Blvd. St. Louis, Missouri	Test Start Date:	June 4, 2008
		Test Method:	ASTM D 5084

TEST SPECIMEN DATA

Initial Data:		Final Data:	
Length:	3.641 inches		
Diameter:	2.864 inches		
Sample Weight:	751.1 grams		
Dry Unit Weight:	96.2 pcf		
Moisture Content:	26.8 percent	Moisture Content:	27.2 percent

FLOW DATA

Permeant Liquid	Tap Water	Cell Pressure, psi	33
Temperature, °C	20	Inflow Pressure, psi	30
		Outflow Pressure, psi	30
B Value (Prior to permeation):	97%	Average Hydraulic Gradient	0.9

Hydraulic Conductivity

(cm/sec)

Test Interval 1	1.6E-06
Test Interval 2	1.5E-06
Test Interval 3	1.4E-06
Test Interval 4	1.5E-06

Average k	1.5E-06
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HYDRAULIC CONDUCTIVITY TEST RESULTS



PROJECT DATA

Date Sampled:	May 23, 2008	Sample Number:	CB-06-S-20
Project Number:	SG15-4302	Sample Depth:	20.0 - 22.0 Feet
Project Name:	SLOP R1	Sample Type:	Shelby Tube
Project Location:	4301 Goodfellow Blvd. St. Louis, Missouri	Test Start Date:	May 28, 2008
		Test Method:	ASTM D 5084

TEST SPECIMEN DATA

Initial Data:		Final Data:	
Length:	3.843 inches		
Diameter:	2.830 inches		
Sample Weight:	769.9 grams		
Dry Unit Weight:	95.3 pcf		
Moisture Content:	27.3 percent	Moisture Content:	28.2 percent

FLOW DATA

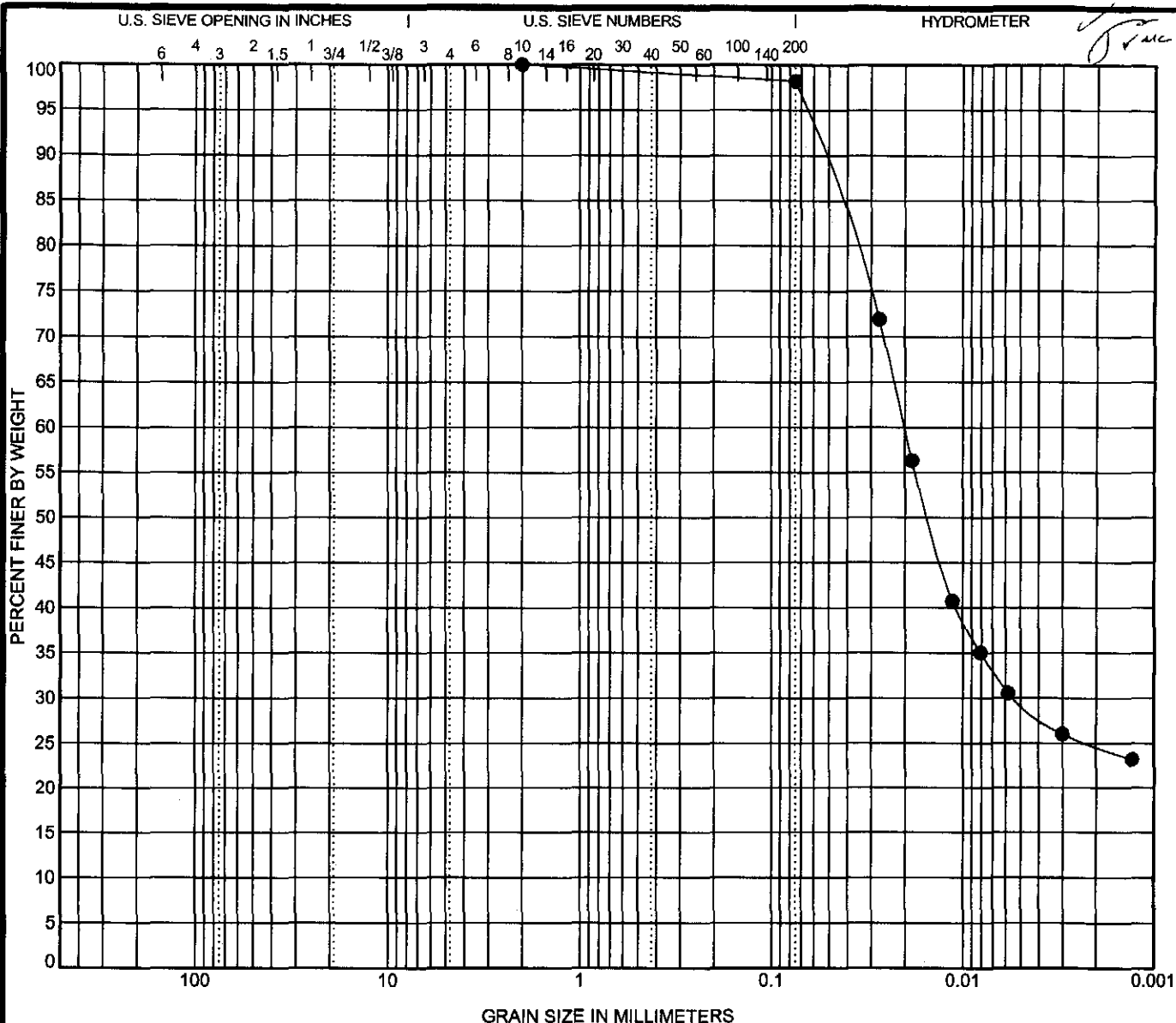
Permeant Liquid	Tap Water	Cell Pressure, psi	33
Temperature, °C	20	Inflow Pressure, psi	30
		Outflow Pressure, psi	30
B Value (Prior to permeation):	95%	Average Hydraulic Gradient	1.4

Hydraulic Conductivity

(cm/sec)

Test Interval 1	1.6E-07
Test Interval 2	1.6E-07
Test Interval 3	1.5E-07
Test Interval 4	1.4E-07

Average k	1.5E-07
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COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● CB-02-S-3 3.0-5.0'	Brown Silty CLAY, CL					

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● CB-02-S-3 3.0-5.0'	2	0.02	0.005		0.0	1.8	68.7	29.5



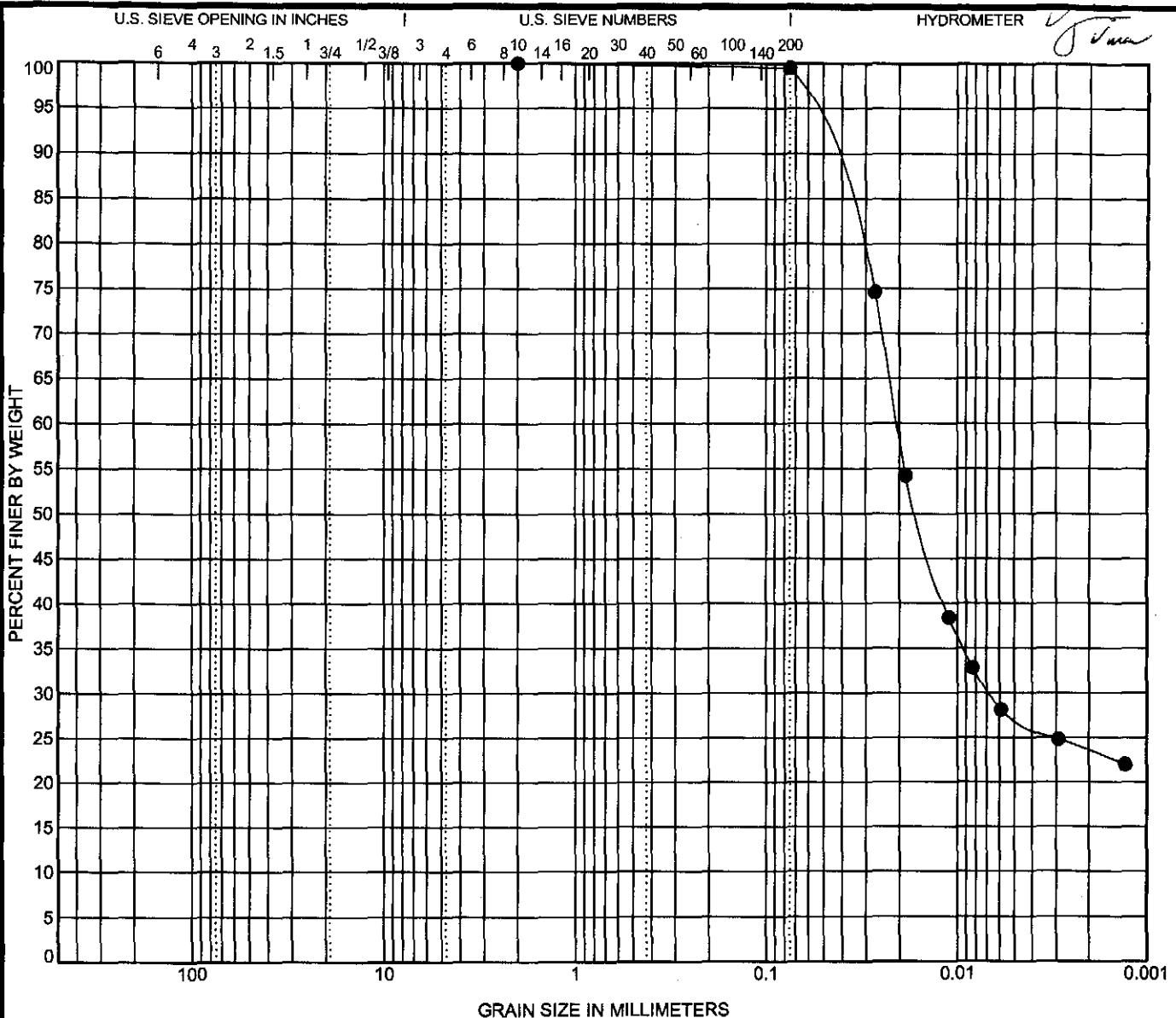
Missouri (314) 770-1001
Illinois (618) 398-1414

GRAIN SIZE DISTRIBUTION

Project Number: SG15-4302

Project: SLOP R1 - 4301 Goodfellow Blvd.

Location: St. Louis, Missouri



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		Classification					LL	PL	PI	Cc	Cu
●	CB-05-S-12 12.0-14.0'	Yellow-Brown Silty CLAY, CL									
Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay		
●	CB-05-S-12 12.0-14.0'	2	0.021	0.007		0.0	0.5	72.2	27.3		



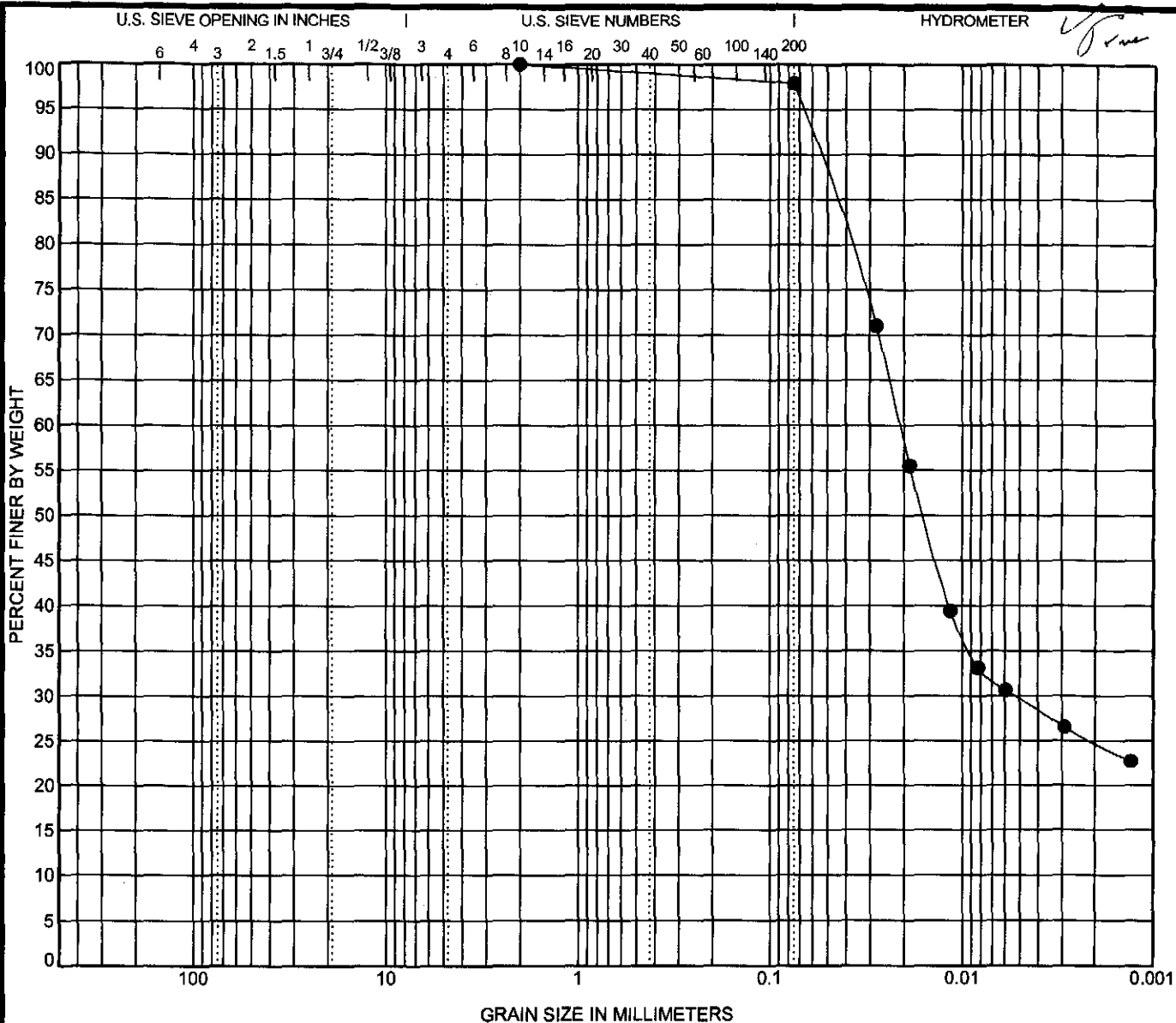
Missouri (314) 770-1001
Illinois (618) 398-1414

GRAIN SIZE DISTRIBUTION

Project Number: SG15-4302

Project: SLOP R1 - 4301 Goodfellow Blvd.

Location: St. Louis, Missouri



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification					LL	PL	PI	Cc	Cu
● CB-05-S-17 17.0-19.0'	Yellow-Brown Silty CLAY, CL									

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● CB-05-S-17 17.0-19.0'	2	0.021	0.005		0.0	2.1	68.2	29.6



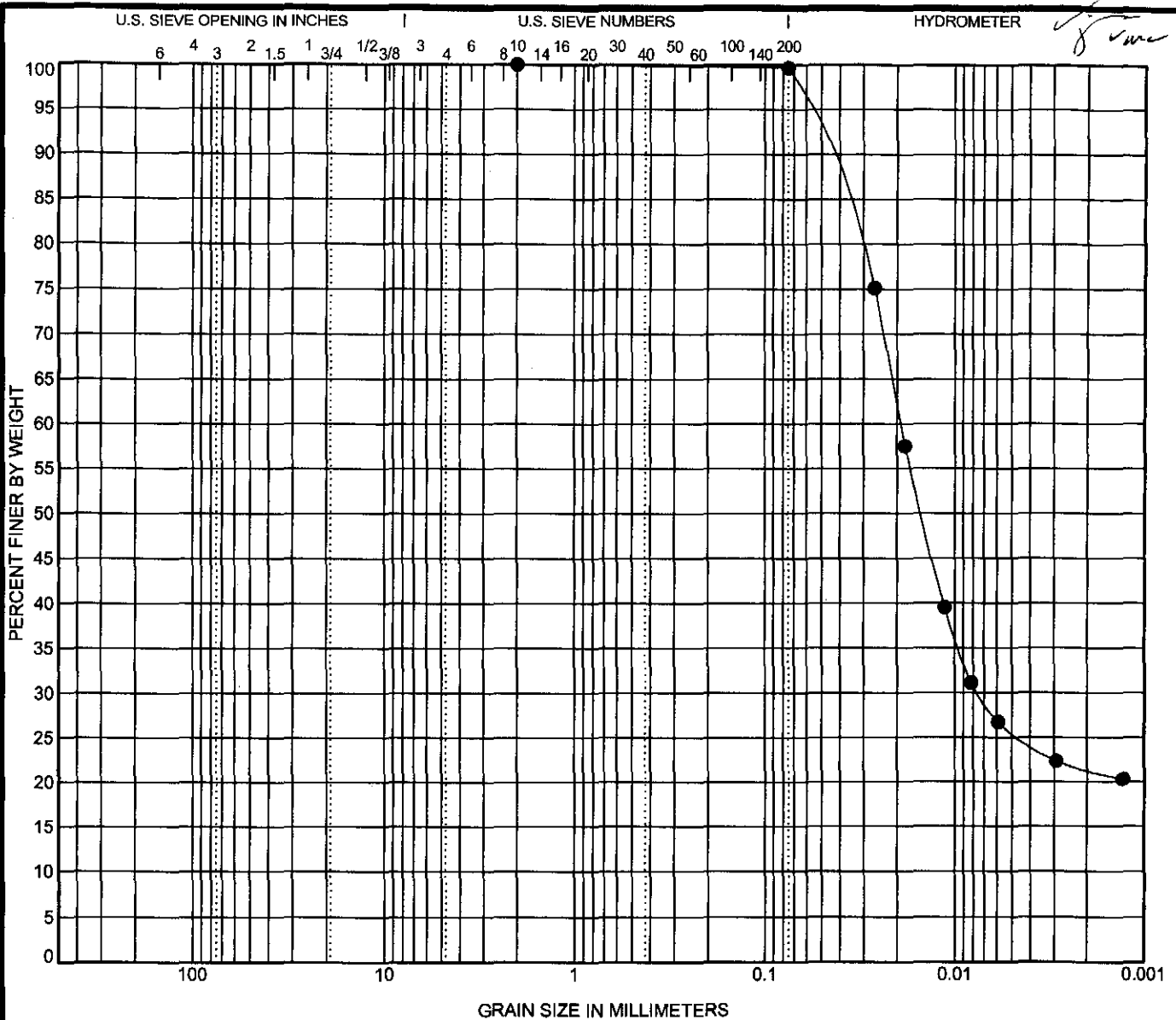
Missouri (314) 770-1001
Illinois (618) 398-1414

GRAIN SIZE DISTRIBUTION

Project Number: SG15-4302

Project: SLOP R1 - 4301 Goodfellow Blvd.

Location: St. Louis, Missouri



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification					LL	PL	PI	Cc	Cu
● CB-06-S-13 13.0-15.0'	Brown Silty CLAY, CL									

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● CB-06-S-13 13.0-15.0'	2	0.019	0.008		0.0	0.3	74.0	25.7



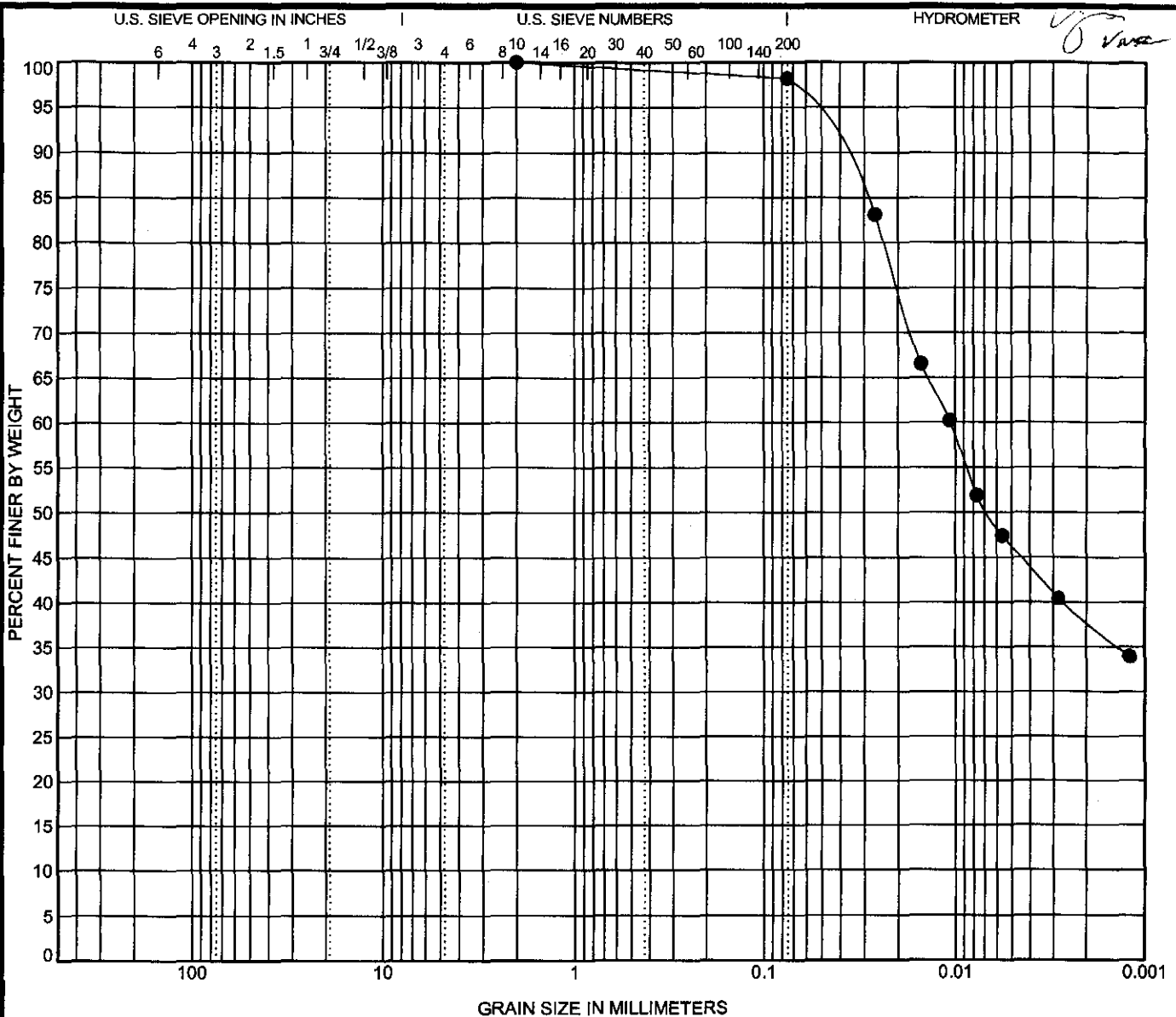
Missouri (314) 770-1001
Illinois (618) 398-1414

GRAIN SIZE DISTRIBUTION

Project Number: SG15-4302

Project: SLOP R1 - 4301 Goodfellow Blvd.

Location: St. Louis, Missouri



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		Classification					LL	PL	PI	Cc	Cu
●	CB-06-S-20 20.0-22.0'	Brown Silty CLAY & Dark Yellow-Brown CLAY, CL/CH									
Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay		
●	CB-06-S-20 20.0-22.0'	2	0.011			0.0	1.8	51.9	46.3		



Missouri (314) 770-1001
Illinois (618) 398-1414

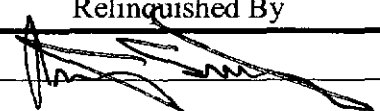
GRAIN SIZE DISTRIBUTION

Project Number: SG15-4302

Project: SLOP R1 - 4301 Goodfellow Blvd.

Location: St. Louis, Missouri

CHAIN OF CUSTODY RECORD

Project Name: <u>SLOP R1</u>							Shively Geotechnical, Inc.									
Owners Name: _____							Main Office 11 French Village Industrial Park Fairview Heights, Illinois 62208 (618) 398-1414									
Site Location: <u>4301 Goodfellow Blvd.</u> <u>St. Louis, MO</u>							8460 North Lindbergh, Suite 10 St. Louis, Missouri 63031 (314) 770-1001					6707 North Sheridan Road, Space P Peoria, Illinois 61614 (309) 282-2168				
Samples Collected By: <u>J. Swienzek</u>							ASTM Parameters									
Company Name: <u>CH2M Hill</u> <u>Shively Project No. SG15-4302</u>																
Boring Number	Sample Number	Depth (feet)	Sample Type	Date	No. of Containers	Condition Upon Arrival	Grain Size (Unified)	Grain Size (ASTM)	Moisture (ASTM)	Shrinkage (ASTM)	Specific Gravity	Unit Weight	Void Ratio	Porosity	Compression	Comments
SB-02-S-3		3-5	Shelby Tube	05/21/08	1		X	X	X							
SB-02-S-3		3-5	Soil Jar	05/21/08	1		X	X	X							
Lab Instructions:							* Request has been made by David Lee to change sample designation from SB to CB 5/22/08									
Relinquished By			Date		Time		Received By			Date		Time				
			05/21/08		1530		Jan M May			5/21/08		1530				

CHAIN OF CUSTODY RECORD

[illegible]

Project Name: <u>SLOP R1</u>							Shively Geotechnical, Inc.																																																																																																																																																																	
Owners Name: _____							Main Office 11 French Village Industrial Park Fairview Heights, Illinois 62208 (618) 398-1414																																																																																																																																																																	
Site Location: <u>4301 Goodfellow Blvd.</u> <u>St Louis, MO</u>							8460 North Lindbergh, Suite 10 St Louis, Missouri 63031 (314) 770-1001					6707 North Sheridan Road, Space P Peoria, Illinois 61614 (309) 282-2168																																																																																																																																																												
Samples Collected By: _____							ASTM Parameters																																																																																																																																																																	
Company Name: <u>CH2M Hill</u>																																																																																																																																																																								
Boring Number	Sample Number	Depth (feet)	Sample Type	Date	No. of Containers	Condition Upon Arrival	Grain Size (20)	Grain Size (40)	Grain Size (60)	Grain Size (100)	Grain Size (200)	Grain Size (400)	Grain Size (600)	Grain Size (800)	Grain Size (1000)	Grain Size (1500)	Grain Size (2000)	Grain Size (3000)	Grain Size (4000)	Grain Size (6000)	Grain Size (8000)	Grain Size (10000)	Grain Size (15000)	Grain Size (20000)	Grain Size (30000)	Grain Size (40000)	Grain Size (60000)	Grain Size (80000)	Grain Size (100000)	Grain Size (150000)	Grain Size (200000)	Grain Size (300000)	Grain Size (400000)	Grain Size (600000)	Grain Size (800000)	Grain Size (1000000)	Grain Size (1500000)	Grain Size (2000000)	Grain Size (3000000)	Grain Size (4000000)	Grain Size (6000000)	Grain Size (8000000)	Grain Size (10000000)	Grain Size (15000000)	Grain Size (20000000)	Grain Size (30000000)	Grain Size (40000000)	Grain Size (60000000)	Grain Size (80000000)	Grain Size (100000000)	Grain Size (150000000)	Grain Size (200000000)	Grain Size (300000000)	Grain Size (400000000)	Grain Size (600000000)	Grain Size (800000000)	Grain Size (1000000000)	Grain Size (1500000000)	Grain Size (2000000000)	Grain Size (3000000000)	Grain Size (4000000000)	Grain Size (6000000000)	Grain Size (8000000000)	Grain Size (10000000000)	Grain Size (15000000000)	Grain Size (20000000000)	Grain Size (30000000000)	Grain Size (40000000000)	Grain Size (60000000000)	Grain Size (80000000000)	Grain Size (100000000000)	Grain Size (150000000000)	Grain Size (200000000000)	Grain Size (300000000000)	Grain Size (400000000000)	Grain Size (600000000000)	Grain Size (800000000000)	Grain Size (1000000000000)	Grain Size (1500000000000)	Grain Size (2000000000000)	Grain Size (3000000000000)	Grain Size (4000000000000)	Grain Size (6000000000000)	Grain Size (8000000000000)	Grain Size (10000000000000)	Grain Size (15000000000000)	Grain Size (20000000000000)	Grain Size (30000000000000)	Grain Size (40000000000000)	Grain Size (60000000000000)	Grain Size (80000000000000)	Grain Size (100000000000000)	Grain Size (150000000000000)	Grain Size (200000000000000)	Grain Size (300000000000000)	Grain Size (400000000000000)	Grain Size (600000000000000)	Grain Size (800000000000000)	Grain Size (1000000000000000)	Grain Size (1500000000000000)	Grain Size (2000000000000000)	Grain Size (3000000000000000)	Grain Size (4000000000000000)	Grain Size (6000000000000000)	Grain Size (8000000000000000)	Grain Size (10000000000000000)	Grain Size (15000000000000000)	Grain Size (20000000000000000)	Grain Size (30000000000000000)	Grain Size (40000000000000000)	Grain Size (60000000000000000)	Grain Size (80000000000000000)	Grain Size (100000000000000000)	Grain Size (150000000000000000)	Grain Size (200000000000000000)	Grain Size (300000000000000000)	Grain Size (400000000000000000)	Grain Size (600000000000000000)	Grain Size (800000000000000000)	Grain Size (1000000000000000000)	Grain Size (1500000000000000000)	Grain Size (2000000000000000000)	Grain Size (3000000000000000000)	Grain Size (4000000000000000000)	Grain Size (6000000000000000000)	Grain Size (8000000000000000000)	Grain Size (10000000000000000000)	Grain Size (15000000000000000000)	Grain Size (20000000000000000000)	Grain Size (30000000000000000000)	Grain Size (40000000000000000000)	Grain Size (60000000000000000000)	Grain Size (80000000000000000000)	Grain Size (100000000000000000000)	Grain Size (150000000000000000000)	Grain Size (200000000000000000000)	Grain Size (300000000000000000000)	Grain Size (400000000000000000000)	Grain Size (600000000000000000000)	Grain Size (800000000000000000000)	Grain Size (1000000000000000000000)	Grain Size (1500000000000000000000)	Grain Size (2000000000000000000000)	Grain Size (3000000000000000000000)	Grain Size (4000000000000000000000)	Grain Size (6000000000000000000000)	Grain Size (8000000000000000000000)	Grain Size (10000000000000000000000)	Grain Size (15000000000000000000000)	Grain Size (20000000000000000000000)	Grain Size (30000000000000000000000)	Grain Size (40000000000000000000000)	Grain Size (60000000000000000000000)	Grain Size (80000000000000000000000)	Grain Size (100000000000000000000000)	Grain Size (150000000000000000000000)	Grain Size (200000000000000000000000)	Grain Size (300000000000000000000000)	Grain Size (400000000000000000000000)	Grain Size (600000000000000000000000)	Grain Size (800000000000000000000000)	Grain Size (1000000000000000000000000)	Grain Size (1500000000000000000000000)	Grain Size (2000000000000000000000000)	Grain Size (3000000000000000000000000)	Grain Size (4000000000000000000000000)	Grain Size (6000000000000000000000000)	Grain Size (8000000000000000000000000)



PEL a division of Spectrum Analytical, Inc.

featuring HANIBAL TECHNOLOGY



Customer Name: CH2M Hill
Date and Time Received: 5/14/2008 8:30:00 AM
Date Reported: 5/19/2008
Laboratory Submission Number/SDG: 2509258
Project: SLOP RI / 364298.01.SL.RI.FW

Samples: The submission consisted of 20 samples with sample identification shown in the attached data tables.

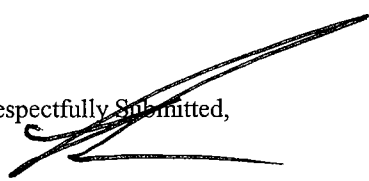
Tests: The samples were analyzed for the methods listed on the attached table of contents.

Results: See the attached data tables for results.

Distribution of Report to:

CH2M Hill
Attn: Dave Lee
Phone: W 314-421-0900

Respectfully Submitted,


Brian Spann
Laboratory Director
PEL a division of Spectrum Analytical, Inc.
featuring Hanibal Technology

Note: Submitted material will be retained for 30 days unless otherwise requested by client or consumed in analysis. PEL letters and reports are for the exclusive use of the client to whom they are addressed. Our Letters and reports apply to the sample tested and are not necessarily indicative of the qualities of apparently identical or similar materials

8405 Benjamin Road, Suite A • Tampa, Florida 33634
813-888-9507 • FAX: 800-480-6435
Website: www.pelab.com

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METALS DATA PACKAGE TOTALS	8
Sample Data	12
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Chain of Custody Documentation	51
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EXECUTIVE SUMMARY - Detection Highlights

2509258

SAMPLE ID: FD-S-051308A

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
Arsenic	7.09	1.5	MG/KG	SW6010B

SAMPLE ID: FD-S-051308B

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
Arsenic	9.02	0.736	MG/KG	SW6010B

SAMPLE ID: HA-01-S-00

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
Arsenic	8.82	0.866	MG/KG	SW6010B

SAMPLE ID: HA-02-S-00

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
Arsenic	9.41	0.814	MG/KG	SW6010B

SAMPLE ID: HA-03-S-00

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
Arsenic	10	0.873	MG/KG	SW6010B

SAMPLE ID: HA-04-S-00

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
Arsenic	5.94	0.796	MG/KG	SW6010B

EXECUTIVE SUMMARY - Detection Highlights

2509258

SAMPLE ID: HA-05-S-00

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
Arsenic	36.3	0.826	MG/KG	SW6010B

SAMPLE ID: HA-06-S-00

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
Arsenic	18.2	0.835	MG/KG	SW6010B

SAMPLE ID: HA-07-S-00

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
Arsenic	8.11	0.846	MG/KG	SW6010B

SAMPLE ID: HA-08-S-00

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
Arsenic	7.39	0.78	MG/KG	SW6010B

SAMPLE ID: HA-09-S-00

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
Arsenic	5.9	0.789	MG/KG	SW6010B

EXECUTIVE SUMMARY - Detection Highlights

2509258

SAMPLE ID: HA-10-S-00

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
Arsenic	8.06	0.816	MG/KG	SW6010B

SAMPLE ID: HA-11-S-00

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
Arsenic	9.42	1.64	MG/KG	SW6010B

SAMPLE ID: HA-12-S-00

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
Arsenic	8.41	0.892	MG/KG	SW6010B

SAMPLE ID: HA-13-S-00

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
Arsenic	9.05	0.755	MG/KG	SW6010B

SAMPLE ID: HA-14-S-00

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
Arsenic	8.19	0.752	MG/KG	SW6010B

SAMPLE ID: HA-15-S-00

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
Arsenic	9.14	0.856	MG/KG	SW6010B

EXECUTIVE SUMMARY - Detection Highlights

2509258

SAMPLE ID: HA-16-S-00

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
Arsenic	5.47	0.79	MG/KG	SW6010B

Inorganics

Inorganic Data Qualifiers

C (Concentration) Qualifier - Entries and their meanings are:

- B** The reported value obtained was less than the RL but greater than or equal to the MDL.
- E** The reported value obtained was over calibration or linear range.
- U** The reported value obtained was less than the MDL or was not detected.

Q Qualifier - Entries and their meanings are:

- U** The reported value is estimated because of interference. An explanatory comment must be included under "Comments" on the Cover Page if the problem applies to all samples in this data package or on the individual FORM 1 if it is an isolated problem.
- M** Duplicate injection precision was not met (two analyses of the same sample did not agree).
- N** Spiked sample recovery not within control limits.
- E** Serial Dilution percent difference not within control limits.
- S** The reported value was determined by the Method of Standard Additions (MSA).
- W** Post-digestion spike for Furnace AA analysis is out of control limits (85-115%) while sample absorbance is less than 50% of spike absorbance.
- *** Duplicate analysis not within control limits.
- +** Correlation coefficient for the MSA is less than 0.995.
- X** The data is flagged as rejected by analyst utilizing analytical judgement.

Entering "S", "W", or "+" is mutually exclusive. No combination of these qualifiers can appear in the same field.

M (Method) Qualifier - Enter one of the following:

- P** ICP
- A** Flame AA
- F** Furnace AA
- CV** Manual Cold Vapor AA
- TC** Total Organic Carbon
- AS** Semi-Automated Spectrophotometric
- CA** Midi-Distillation Spectrophotometric
- T** Titrimetric
- C** Manual Spectrophotometric
- GR** Gravimetric
- NR** Analyte was not required by your lab

Inorganic Sample ID Qualifiers

The qualifiers that may be appended to the lab sample ID and/or the client sample ID for inorganic analysis are defined below:

- DL** Diluted reanalysis. Indicates that the results of the original analysis of the sample contained compounds that exceeded the calibration range. The sample was diluted and reanalyzed. May be followed by a digit to indicate multiple dilutions of the sample. The results of more than one diluted reanalysis may be reported.
- R** Reanalysis. The extract was reanalyzed without re-extraction. The "R" is not used if the sample was also re-extracted. May be followed by a digit to indicate multiple reanalysis of the sample at the same dilution.
- RE** Re-extracted. The extract was reanalyzed with re-extraction. May be followed by a digit to indicate multiple re-extraction of the same sample at the same dilution.
- MS** Matrix spike (may be followed by a digit to indicate multiple matrix within a sample set).
- SD** Matrix spike duplicate (may be followed by a digit to indicate multiple matrix spike duplicate within a sample set).
- A** Post Digestion Spike.
- L** Serial Dilution.

METALS DATA PACKAGE TOTALS

CASE NARRATIVE METALS

PEL Lab Reference No./SDG: 2509258

Client: CH2M Hill

I. RECEIPT

No exceptions were encountered unless a Sample Receipt Exception Report is attached to the Chain-of-Custody or a communication form is included in the addendum with this package.

II. HOLDING TIMES

A. Sample Preparation: All holding times were met.

B. Sample Analysis: All holding times were met.

III. METHOD

Analyses were performed according to the PEL, a Division of Spectrum Analytical, Standard Operating Procedures and EPA Method 6010B for ICP metals.

IV. PREPARATION

Soil samples were prepared according to PEL Laboratory's Standard Operating Procedures and EPA Method 3050B.

V. ANALYSIS

A. Calibration:

All acceptance criteria were met.

B. Blanks:

1. Calibration Blanks:

All acceptance criteria were met.

2. Method Blanks:

All acceptance criteria were met.

C. Spikes:

1. Laboratory Control Spikes (LCS):

An LCS/LCSD set was analyzed.

All percent recovery and relative percent difference (RPD) criteria were met.

2. Post Digestion Spike:

All acceptance criteria were met.

**CASE NARRATIVE
METALS**

PEL Lab Reference No./SDG: 2509258

Client: CH2M Hill

3. Matrix Spike/Matrix Spike Duplicate Samples (MS/SD):

A client requested MS/SD set was analyzed.
All percent recovery and relative percent difference (RPD) criteria were met.

D. Duplicate:

No sample duplicates are reported with this method. (Spike duplicates are referenced above in section C. Spikes.)

E. Serial Dilution:

All acceptance criteria were met.

F. ICP Interference Check Samples:

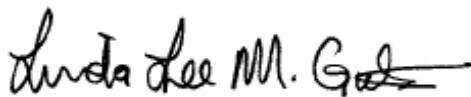
All acceptance criteria were met.

G. Samples:

Sample analysis proceeded normally.

Samples FD-S-051308A, HA-11-S-00 required a 1:2 dilution due to interference with the following analyte(s): Arsenic.

I certify that this data package is in compliance with the terms and conditions agreed to by the client and PEL, both technically and for completeness, except for the conditions noted above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designated person, as, verified by the following signature.



SIGNED:

DATE: 05/15/2008

U.S. EPA - CLP
COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Lab Name: PEL, Spectrum Analytical, Inc. Contract: SLOP RI / 364298.01.SL.
 Lab Code : PEL Case No.: _____ SDG No.: 2509258
 SOW No.: _____

EPA Sample No	Lab Sample ID
HA-01-S-00	250925801
HA-03-S-00	250925802
HA-02-S-00	250925805
HA-05-S-00	250925806
HA-04-S-00	250925807
HA-06-S-00	250925808
HA-07-S-00	250925809
HA-08-S-00	250925810
HA-09-S-00	250925811
FD-S-051308A	250925812
HA-11-S-00	250925813
HA-12-S-00	250925814
FD-S-051308B	250925815
HA-13-S-00	250925816
HA-14-S-00	250925817
HA-15-S-00	250925818
HA-16-S-00	250925819
HA-10-S-00	250925820

Were ICP interelement corrections applied? Yes/No Yes

Were ICP background corrections applied? Yes/No Yes

If yes - were raw data generated before application of background corrections? Yes/No No

Comments:

Sample Data

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: PEL, Spectrum Analytical, Inc. Contract: SLOP RI / 364298.01.SL.RI.FW

HA-01-S-00

Lab Code : PEL Case No.: _____ SAS No: _____ SDG No.: 2509258Matrix: SOIL Lab Sample ID: 250925801Level:(low/med) LOW Date Received: 5/14/2008PercentSolids: 79.7 Station ID: _____CONCENTRATION UNITS: MG/KG

CAS NO.	ANALYTE	Concentration	C	Q	M
7440-38-2	Arsenic	8.82			P

Color Before: _____ Clarity Before: _____ Texture : _____

Color After : _____ Clarity After: _____ Artifacts: _____

Comments:

190508 1025

1

EPA Sample No.

HA-03-S-00

SDG No.: 2509258Lab Sample ID: 250925802

Date Received: 5/14/2008

Station ID:

CAS NO.	ANALYTE	Concentration	C	Q	M
7440-38-2	Arsenic	10			P

Clarity Before: _____

Texture : _____

Clarity After: _____

Artifacts:_____

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: PEL, Spectrum Analytical, Inc. Contract: SLOP RI / 364298.01.SL.RI.FW

HA-02-S-00

Lab Code : PEL Case No.: _____ SAS No: _____ SDG No.: 2509258Matrix: SOIL Lab Sample ID: 250925805Level:(low/med) LOW Date Received: 5/14/2008PercentSolids: 82.2 Station ID: _____CONCENTRATION UNITS: MG/KG

CAS NO.	ANALYTE	Concentration	C	Q	M
7440-38-2	Arsenic	9.41			P

Color Before: _____ Clarity Before: _____ Texture : _____

Color After : _____ Clarity After: _____ Artifacts: _____

Comments:

190508 1025

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: PEL, Spectrum Analytical, Inc. Contract: SLOP RI / 364298.01.SL.RI.FW

HA-05-S-00

Lab Code : PEL Case No.: _____ SAS No: _____ SDG No.: 2509258Matrix: SOIL Lab Sample ID: 250925806Level:(low/med) LOW Date Received: 5/14/2008PercentSolids: 82 Station ID: _____CONCENTRATION UNITS: MG/KG

CAS NO.	ANALYTE	Concentration	C	Q	M
7440-38-2	Arsenic	36.3			P

Color Before: _____ Clarity Before: _____ Texture : _____

Color After : _____ Clarity After: _____ Artifacts: _____

Comments:

190508 1025

1

EPA Sample No.

HA-04-S-00

SDG No.: 2509258

Lab Sample ID: 250925807

Date Received: 5/14/2008

Station ID:

CAS NO.	ANALYTE	Concentration	C	Q	M
7440-38-2	Arsenic	5.94			P

Clarity Before: _____

Texture : _____

Clarity After: _____

Artifacts:_____

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: PEL, Spectrum Analytical, Inc. Contract: SLOP RI / 364298.01.SL.RI.FW

HA-06-S-00

Lab Code : PEL Case No.: _____ SAS No: _____ SDG No.: 2509258Matrix: SOIL Lab Sample ID: 250925808Level:(low/med) LOW Date Received: 5/14/2008PercentSolids: 79.6 Station ID: _____CONCENTRATION UNITS: MG/KG

CAS NO.	ANALYTE	Concentration	C	Q	M
7440-38-2	Arsenic	18.2			P

Color Before: _____ Clarity Before: _____ Texture : _____

Color After : _____ Clarity After: _____ Artifacts: _____

Comments:

190508 1025

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: PEL, Spectrum Analytical, Inc. Contract: SLOP RI / 364298.01.SL.RI.FW

HA-07-S-00

Lab Code : PEL Case No.: _____ SAS No: _____ SDG No.: 2509258Matrix: SOIL Lab Sample ID: 250925809Level:(low/med) LOW Date Received: 5/14/2008PercentSolids: 80.3 Station ID: _____CONCENTRATION UNITS: MG/KG

CAS NO.	ANALYTE	Concentration	C	Q	M
7440-38-2	Arsenic	8.11			P

Color Before: _____ Clarity Before: _____ Texture : _____

Color After : _____ Clarity After: _____ Artifacts: _____

Comments:

190508 1025

2509258

19

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: PEL, Spectrum Analytical, Inc. Contract: SLOP RI / 364298.01.SL.RI.FW

HA-08-S-00

Lab Code : PEL Case No.: _____ SAS No: _____ SDG No.: 2509258Matrix: SOIL Lab Sample ID: 250925810Level:(low/med) LOW Date Received: 5/14/2008PercentSolids: 80.2 Station ID: _____CONCENTRATION UNITS: MG/KG

CAS NO.	ANALYTE	Concentration	C	Q	M
7440-38-2	Arsenic	7.39			P

Color Before: _____ Clarity Before: _____ Texture : _____

Color After : _____ Clarity After: _____ Artifacts: _____

Comments:

190508 1025

2509258

20

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: PEL, Spectrum Analytical, Inc. Contract: SLOP RI / 364298.01.SL.RI.FW

HA-09-S-00

Lab Code : PEL Case No.: _____ SAS No: _____ SDG No.: 2509258Matrix: SOIL Lab Sample ID: 250925811Level:(low/med) LOW Date Received: 5/14/2008PercentSolids: 80.9

Station ID: _____

CONCENTRATION UNITS: MG/KG

CAS NO.	ANALYTE	Concentration	C	Q	M
7440-38-2	Arsenic	5.9			P

Color Before: _____ Clarity Before: _____ Texture : _____

Color After : _____ Clarity After: _____ Artifacts: _____

Comments:

190508 1025

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: PEL, Spectrum Analytical, Inc. Contract: SLOP RI / 364298.01.SL.RI.FW

FD-S-051308A

Lab Code : PEL Case No.: _____ SAS No: _____ SDG No.: 2509258Matrix: SOIL Lab Sample ID: 250925812Level:(low/med) LOW Date Received: 5/14/2008PercentSolids: 85.3 Station ID: _____CONCENTRATION UNITS: MG/KG

CAS NO.	ANALYTE	Concentration	C	Q	M
7440-38-2	Arsenic	7.09			P

Color Before: _____ Clarity Before: _____ Texture : _____

Color After : _____ Clarity After: _____ Artifacts: _____

Comments:

1

EPA Sample No.

HA-12-S-00

SDG No.: 2509258

Lab Sample ID: 250925814

Date Received: 5/14/2008

Station ID:

CAS NO.	ANALYTE	Concentration	C	Q	M
7440-38-2	Arsenic	8.41			P

Clarity Before: _____

Texture : _____

Clarity After: _____

Artifacts:_____

1

EPA Sample No.

FD-S-051308B

SDG No.: 2509258

Lab Sample ID: 250925815

Date Received: 5/14/2008

Station ID:

CAS NO.	ANALYTE	Concentration	C	Q	M
7440-38-2	Arsenic	9.02			P

Clarity Before: _____

Texture : _____

Clarity After: _____

Artifacts:_____

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: PEL, Spectrum Analytical, Inc. Contract: SLOP RI / 364298.01.SL.RI.FW

HA-13-S-00

Lab Code : PEL Case No.: _____ SAS No: _____ SDG No.: 2509258Matrix: SOIL Lab Sample ID: 250925816Level:(low/med) LOW Date Received: 5/14/2008PercentSolids: 80.9

Station ID: _____

CONCENTRATION UNITS: MG/KG

CAS NO.	ANALYTE	Concentration	C	Q	M
7440-38-2	Arsenic	9.05			P

Color Before: _____ Clarity Before: _____ Texture : _____

Color After : _____ Clarity After: _____ Artifacts: _____

Comments:

190508 1025

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: PEL, Spectrum Analytical, Inc. Contract: SLOP RI / 364298.01.SL.RI.FW

HA-14-S-00

Lab Code : PEL Case No.: _____ SAS No: _____ SDG No.: 2509258Matrix: SOIL Lab Sample ID: 250925817Level:(low/med) LOW Date Received: 5/14/2008PercentSolids: 80.9

Station ID: _____

CONCENTRATION UNITS: MG/KG

CAS NO.	ANALYTE	Concentration	C	Q	M
7440-38-2	Arsenic	8.19			P

Color Before: _____ Clarity Before: _____ Texture : _____

Color After : _____ Clarity After: _____ Artifacts: _____

Comments:

190508 1025

2509258

27

1

EPA Sample No.

HA-15-S-00

SDG No.: 2509258

Lab Sample ID: 250925818

Date Received: 5/14/2008

Station ID:

CAS NO.	ANALYTE	Concentration	C	Q	M
7440-38-2	Arsenic	9.14			P

Clarity Before: _____

Texture : _____

Clarity After: _____

Artifacts:_____

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: PEL, Spectrum Analytical, Inc. Contract: SLOP RI / 364298.01.SL.RI.FW

HA-16-S-00

Lab Code : PEL Case No.: _____ SAS No: _____ SDG No.: 2509258Matrix: SOIL Lab Sample ID: 250925819Level:(low/med) LOW Date Received: 5/14/2008PercentSolids: 81.8

Station ID: _____

CONCENTRATION UNITS: MG/KG

CAS NO.	ANALYTE	Concentration	C	Q	M
7440-38-2	Arsenic	5.47			P

Color Before: _____ Clarity Before: _____ Texture : _____

Color After : _____ Clarity After: _____ Artifacts: _____

Comments:

190508 1025

1

EPA Sample No.

HA-10-S-00

SDG No.: 2509258

Lab Sample ID: 250925820

Date Received: 5/14/2008

Station ID:

CAS NO.	ANALYTE	Concentration	C	Q	M
7440-38-2	Arsenic	8.06			P

Clarity Before: _____

Texture : _____

Clarity After: _____

Artifacts:_____

QC Summary

U.S. EPA - CLP

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: PEL, Spectrum Analytical, Inc. Contract: SLOP RI / 364298.01.SL.RI.FW
 Lab Code : PEL Case No.: SAS No: SDG No.: 2509258
 Initial Calibration Source: 23085

Continuing Calibration Source: 23977

Concentration Units: (ug/L)

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R (1)	True	Found	%R (1)	Found	%R (1)	
Arsenic	400	392.000	98.0	500	507.000	101.4	514.000	102.8	P

ICV IDs: P= ICV604536

CCV1 IDs: P= CCV604541

CCV2 IDs: P= CCV604553

(1) Control Limits: Mercury 80-120; Cyanide 85-115; Other Metals 90-110

ICV is Second Source

190508 1026

U.S. EPA - CLP

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: PEL, Spectrum Analytical, Inc. Contract: SLOP RI / 364298.01.SL.RI.FW
 Lab Code : PEL Case No.: SAS No: SDG No.: 2509258
 Initial Calibration Source:

Continuing Calibration Source: 23977

Concentration Units: (ug/L)

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R (1)	True	Found	%R (1)	Found	%R (1)	
Arsenic				500	521.000	104.2	522.000	104.4	P

ICV IDs:

CCV1 IDs: P= CCV604566

CCV2 IDs: P= CCV604567

(1) Control Limits: Mercury 80-120; Cyanide 85-115; Other Metals 90-110

ICV is Second Source

190508 1026

U.S. EPA - CLP

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: PEL, Spectrum Analytical, Inc. Contract: SLOP RI / 364298.01.SL.RI.FW
 Lab Code : PEL Case No.: SAS No: SDG No.: 2509258
 Initial Calibration Source:

Continuing Calibration Source: 23977

Concentration Units: (ug/L)

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R (1)	True	Found	%R (1)	Found	%R (1)	
Arsenic				500	524.000	104.8	529.000	105.8	P

ICV IDs:

CCV1 IDs: P= CCV604579

CCV2 IDs: P= CCV604591

(1) Control Limits: Mercury 80-120; Cyanide 85-115; Other Metals 90-110

ICV is Second Source

190508 1026

U.S. EPA - CLP

3

BLANKS

Lab Name: PEL, Spectrum Analytical, Inc. Contract: SLOP RI / 364298.01.SL.RI.FW
 Lab Code : PEL Case No.: SAS No: SDG No.: 2509258
 Preparation Blank Matrix (water/soil): SOIL
 Preparation Blank Concentration Units (ug/L or mg/Kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)		Continuing Calibration Blank (ug/L)						Preparation Blank		M
		C	C		C		C		C		
Arsenic	5	U	5	U	5	U	5	U	0.5	U	P

ICB IDs: P= ICB604537

CCB1 IDs: P= CCB604542

CCB2 IDs: P= CCB604554

CCB3 IDs: P= CCB604555

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3

BLANKS

Lab Name: PEL, Spectrum Analytical, Inc. Contract: SLOP RI / 364298.01.SL.RI.FW

Lab Code : PEL Case No.: SAS No: SDG No.: 2509258

Preparation Blank Matrix (water/soil):

Preparation Blank Concentration Units (ug/L or mg/Kg):

Analyte	Initial Calib. Blank (ug/L)		Continuing Calibration Blank (ug/L)						Preparation Blank		M
		C	C		C		C		C		
Arsenic			5	U	5	U	5	U			P

ICB IDs:

CCB1 IDs: P= CCB604568

CCB2 IDs: P= CCB604580

CCB3 IDs: P= CCB604592

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ICP INTERFERENCE CHECK SAMPLE

Lab Name: PEL, Spectrum Analytical, Inc. Contract: SLOP RI / 364298.01.SL.RI.FW
 Lab Code : PEL Case No.: SAS No: SDG No.: 2509258
 ICP ID#: ICAP2 ICSA Source: 23556
 ICSAB Source: 23557

Concentration Units: UG/L

Analyte	True		Initial Found			Final Found		
	Sol.	Sol.	Sol.	Sol.		Sol.	Sol.	
	A	AB	A	AB	%R	A	AB	%R
Arsenic	0	100	0.828	99.283	99.3			

ICSA: ICS604539

ICSAB: ICS604540

U.S. EPA - CLP
5A
SPIKE SAMPLE RECOVERY

Lab Name: PEL, Spectrum Analytical Contract: SLOP RI / 364298.01.SL.RI. EPA Sample No. HA-03-S-00MS
Lab Code : PEL Case No.: SAS No: SDG No.: 2509258
Matrix: SOIL Level:(low/med) LOW
% Solids for Sample: 80.3

Concentration Units (mg/L or mg/kg): MG/KG

Analyte	Control Limit %R	Spiked Sample		Sample Result (SR)		Spike Added (SA)	%R	Q	M
			C		C				
Arsenic	75 - 125	52		10		43.9	95.7		P

Comments:

190508 1026

U.S. EPA - CLP
5A
SPIKE SAMPLE RECOVERY

EPA Sample No.

Lab Name: PEL, Spectrum Analytical Contract: SLOP RI / 364298.01.SL.RI. HA-03-S-00SD

Lab Code : PEL Case No.: SAS No: SDG No.: 2509258

Matrix: SOIL Level:(low/med) LOW

% Solids for Sample: 80.3

Concentration Units (mg/L or mg/kg): MG/KG

Analyte	Control Limit %R	Spiked Sample		Sample Result (SR)		Spike Added (SA)	%R	Q	M
			C		C				
Arsenic	75 - 125	49.8		10		43.7	91.1		P

Comments:

190508 1026

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5B

POST DIGEST SPIKE SAMPLE RECOVERY

EPA Sample No.

Lab Name: PEL, Spectrum Analytical, Inc. Contract: SLOP RI / 364298.01.SL.RI.

HA-03-S-00A

Lab Code : PEL Case No.: SAS No: SDG No.: 2509258

Matrix: Soil Level:(low/med) LOW

Concentration Units (ug/L or mg/kg): ug/L

Analyte	Control Limit %R	Spiked Sample C	Sample Result (SR) C	Spike Added (SA)	%R	Q	M
Arsenic	80 - 120	602.00	114.60	500	97.6		P

Comments:

190508 1026

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6

DUPLICATES

EPA Sample No.

Lab Name: PEL, Spectrum Analytical Contract: SLOP RI / 364298.01.SL.RI.F

262202LCSD

Lab Code : PEL Case No.: SAS No: SDG No.: 2509258

Matrix: SOIL

Level:(low/med) LOW

% Solids for Sample: 100

% Solids for Duplicate: 100

Concentration Units (mg/L or mg/kg): MG/KG

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Arsenic	20	48.4		49.2		1.6		P

Comments:

190508 1026

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DUPLICATES

EPA Sample No.

Lab Name: PEL, Spectrum Analytical Contract: SLOP RI / 364298.01.SL.RI.F

HA-03-S-00SD

Lab Code : PEL Case No.: SAS No: SDG No.: 2509258

Matrix: SOIL

Level:(low/med) LOW

% Solids for Sample: 80.3

% Solids for Duplicate: 80.3

Concentration Units (mg/L or mg/kg): MG/KG

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Arsenic	20	52		49.8		4.3		P

Comments:

190508 1026

U.S. EPA - CLP

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LABORATORY CONTROL SAMPLE

EPA Sample No.

Lab Name: PEL, Spectrum Analytical Contract: SLOP RI / 364298.01.SL.RI.

262201LCS

Lab Code : PEL Case No.: SAS No: SDG No.: 2509258

Solid LCS Source: 23554, 22381

Aqueous LCS Source:

Analyte	Aqueous			Solid (MG/KG)						
	True	Found	%R	True	Found	C	Limits			%R
Arsenic				50	48.4		80	-	120	96.8

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LABORATORY CONTROL SAMPLE

EPA Sample No.

Lab Name: PEL, Spectrum Analytical Contract: SLOP RI / 364298.01.SL.RI.

262202LCSD

Lab Code : PEL Case No.: SAS No: SDG No.: 2509258

Solid LCS Source: 23554, 22381

Aqueous LCS Source:

Analyte	Aqueous			Solid (MG/KG)						
	True	Found	%R	True	Found	C	Limits			%R
Arsenic				50	49.2		80	-	120	98.4

U.S. EPA - CLP
9
SERIAL DILUTIONS

Lab Name: <u>PEL, Spectrum Analytical</u>		Contract: <u>SLOP RI / 364298.01.SL.RI.F</u>		EPA Sample No. <u>HA-03-S-00L</u>
Lab Code :	<u>PEL</u>	Case No.:	<u> </u>	SAS No: <u> </u> SDG No.: <u>2509258</u>
Matrix:	<u>Soil</u>	Level:(low/med)		<u>LOW</u>

Concentration Units (ug/L or mg/kg): ug/L

Analyte	Initial Sample Result (I)		Serial Dilution Result (S)		% Difference	Q	M
		C		C			
Arsenic	114.60		113.00		1.4		P

Comments:

190508 1026

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METHOD DETECTION LIMITS

Lab Name: PEL, Spectrum Analytical, Inc. Contract: SLOP RI / 364298.01.SL.RI.FW
 Lab Code : PEL Case No.: SAS No: SDG No.: 2509258
 ICP ID Number : ICAP2
 Furnace AA ID Number :

Analyte	Wave-length (nm)	Raw MDL (UG/L)	CRDL (MG/KG)	MDL (MG/KG)	Verification Date	M
Arsenic	188.979	5	1	0.5	4/24/2008	P

Comments:

190508 1026

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ICP LINEAR RANGES (SEMI-ANNUALLY)

Lab Name: PEL, Spectrum Analytical, Inc. Contract: SLOP RI / 364298.01.SL.RI.FW
 Lab Code : PEL Case No.: SAS No: SDG No.: 2509258
 ICP ID NUMBER : ICAP2 DATE : 10/31/2007

Analyte	Integ. Time (sec.)	Concentration UG/L	M
Arsenic	0	5000	P

Comments:

190508 1026

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PREPARATION LOG

Lab Name: PEL, Spectrum Analytical, Inc. Contract: SLOP RI / 364298.01.SL.RI.FW
Lab Code : PEL Case No.: SAS No: SDG No.: 2509258
Method : 6010

EPA Sample No:	Preparation Date	Weight (gram)	Volume (mL)
262200BLK	14 May 08	0.5	
262201LCS	14 May 08	0.5	
262202LCSD	14 May 08	0.5	
FD-S-051308A	14 May 08	0.779	
FD-S-051308B	14 May 08	0.817	
HA-01-S-00	14 May 08	0.724	
HA-02-S-00	14 May 08	0.747	
HA-03-S-00	14 May 08	0.713	
HA-03-S-00MS	14 May 08	0.709	
HA-03-S-00SD	14 May 08	0.712	
HA-04-S-00	14 May 08	0.746	
HA-05-S-00	14 May 08	0.738	
HA-06-S-00	14 May 08	0.752	
HA-07-S-00	14 May 08	0.736	
HA-08-S-00	14 May 08	0.799	
HA-09-S-00	14 May 08	0.783	
HA-10-S-00	14 May 08	0.716	
HA-11-S-00	14 May 08	0.727	
HA-12-S-00	14 May 08	0.712	
HA-13-S-00	14 May 08	0.819	
HA-14-S-00	14 May 08	0.822	
HA-15-S-00	14 May 08	0.725	
HA-16-S-00	14 May 08	0.774	

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ANALYSIS RUN LOG

Lab Name: PEL, Spectrum Analytical, Inc. Contract: SLOP RI / 364298.01.SL.RI.FW

Lab Code: PEL Case No.: SAS No: SDG No.: 2509258

Instrument ID Number: ICAP2 Method: P

Start Date: 5/15/2008 End Date: 5/15/2008

EPA Sample No.	D/F	Time	%R	Analytes																											
				A G	A L	A S	B A	B E	C A	C D	C N	C O	C R	C U	F E	H G	K	L I	M G	M N	M O	N A	N I	P B	S B	S E	S N	S R	T I	T L	V L
CAL01	1	11:21				X																									
CAL02	1	11:26																													
CAL03	1	11:30				X																									
CAL04	1	11:35				X																									
CAL05	1	11:39				X																									
CAL06	1	11:43				X																									
ICV604536	1	11:56				X																									
ICB604537	1	12:00				X																									
ZZZZZZ	1	12:04																													
ICSA	1	12:09				X																									
ICSAB	1	12:14				X																									
CCV604541	1	12:19				X																									
CCB604542	1	12:23				X																									
262200BLK	1	12:27				X																									
262201LCS	1	12:31				X																									
262202LCSD	1	12:35				X																									
HA-03-S-00	1	12:40				X																									
HA-03-S-00L	5	12:44				X																									
HA-03-S-00MS	1	12:48				X																									
HA-03-S-00SD	1	12:52				X																									
HA-03-S-00A	1	12:57				X																									
HA-02-S-00	1	13:01				X																									
HA-05-S-00	1	13:05				X																									
CCV604553	1	13:10				X																									
CCB604554	1	13:16				X																									
CCB604555	1	13:19				X																									
HA-04-S-00	1	13:23				X																									
HA-06-S-00	1	13:27				X																									
HA-07-S-00	1	13:32				X																									
HA-08-S-00	1	13:36				X																									
HA-09-S-00	1	13:41				X																									
ZZZZZZ	1	13:45																													
ZZZZZZ	1	13:49																													
HA-12-S-00	1	13:54				X																									
FD-S-051308B	1	13:58				X																									
HA-13-S-00	1	14:03				X																									

U.S. EPA - CLP

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ANALYSIS RUN LOG

Lab Name: PEL, Spectrum Analytical, Inc. Contract: SLOP RI / 364298.01.SL.RI.FW

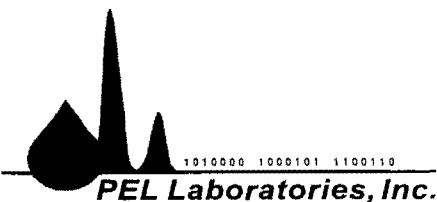
Lab Code: PEL Case No.: SAS No: SDG No.: 2509258

Instrument ID Number: ICAP2 Method: P

Start Date: 5/15/2008 End Date: 5/15/2008

EPA Sample No.	D/F	Time	%R	Analytes																											
				A G	A L	A S	B A	B E	C A	C D	C N	C O	C R	C U	F E	H G	K I	L I	M G	M N	M O	N A	N I	P B	S B	S E	S N	S R	T I	T L	V L
CCV604566	1	14:07				X																									
CCV604567	1	14:10				X																									
CCB604568	1	14:13				X																									
HA-14-S-00	1	14:17				X																									
HA-15-S-00	1	14:21				X																									
HA-16-S-00	1	14:26				X																									
HA-10-S-00	1	14:30				X																									
HA-01-S-00	1	14:34				X																									
ZZZZZZ	2	14:40																													
ZZZZZZ	2	14:44																													
ZZZZZZ	2	14:48																													
ZZZZZZ	2	14:52																													
FD-S-051308A	2	14:56				X																									
CCV604579	1	15:01				X																									
CCB604580	1	15:06				X																									
HA-11-S-00	2	15:14				X																									
ZZZZZZ	2	15:18																													
ZZZZZZ	10	15:22																													
ZZZZZZ	20	15:26																													
ZZZZZZ	2	15:30																													
ZZZZZZ	2	15:34																													
ZZZZZZ	2	15:39																													
ZZZZZZ	2	15:43																													
ZZZZZZ	2	15:47																													
ZZZZZZ	1	15:52																													
CCV604591	1	15:56				X																									
CCB604592	1	16:01				X																									

Chain of Custody Documentation

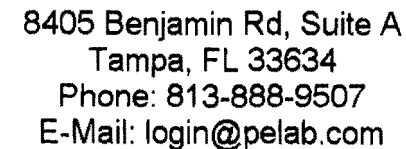


Chain of Custody Record Record/Work Request

8405 Benjamin Rd, Suite A
Tampa, FL 33634
Phone: 813-888-9507
E-Mail: login@pelab.com

2509258 KC

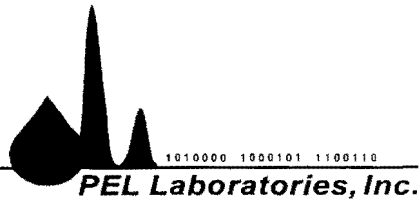
Company: CH2M HILL		Project Name/Number: SLOP RI 364298.01.SL.RI.FW		Page of 3						
Address: 727 N. First St., Suite 400 St. Louis, MO 63102		Project Manager: CHRIS ENGLISH		DEP Form #: 62-770.900(2) Form Title: Chain of Custody Record Effective Date: September 23, 1997 FDEP Facility No. Project Name:						
Phone: 314-335-3000 Fax: 314-421-3927		Purchase Order:		Sampling CompQAP No: Approval Date:						
Print Names(s) / Affiliation Anthony Swierczek, Glynn Roberts, Wayne Conway / CH2M HILL		Preservatives (see codes)		REQUESTED DUE DATE / /						
Sampler(s) Signature(s) 		Analyses Requested		Remarks						
Item No.	Field ID No.	Sampled Date	Time	Grab or Composite	Matrix (see codes)	Number of Containers	Arsenic	TCAP	Heads	Lab. No.
1	HA-01-S-00	05/13/08	1030	Composite	SO	2	X	X		24-HR TAT
2	HA-03-S-00	05/13/08	1150		SO	2	X	X		02
3	HA-03-S-00MS	05/13/08	1150		SO	1	X			03
4	HA-03-S-00-SD	05/13/08	1150		SO	1	X			04
5	HA-02-S-00	05/13/08	1155		SO	2	X	X		05
6	HA-05-S-00	05/13/08	1335		SO	2	X	X		06
7	HA-04-S-00	05/13/08	1400		SO	2	X	X		07
8	HA-06-S-00	05/13/08	1415		SO	2	X	X		08
9	HA-07-S-00	05/13/08	1417		SO	2	X	X		09
Shipment Method				Total Number of Containers						
Out: 5/13/08	Via: FedEx	Item Nos.	Relinquished by / Affiliations	Date	Time	Accepted by / Affiliation	Date	Time		
Returned: / /	Via.			5/16/08	1446					
Additional Comments: Please HOLD				5/13/08	1600	KC	Chris English	5/14/08	830	
TCAP analyses for all samples on this CCR until Arsenic data is received; will run the 5 highest arsenic locations for TCAP analyses for 10-day TAT.		Cooler No. (s) / Temperature(s) (C)		Sampling Kit No.		Equipment ID No.				
		4.0C								
MATRIX CODES: A = Air GW = Groundwater SE = Sediment SO = Soil SW = Surface Water W = Water (Blanks) O = Other (specify)										
PRESERVATION CODES: H-Hydrochloric acid + ice I = Ice only N = Nitric acid + ice S = Sulfuric acid + ice O = Other (specify)										



2509258 KC

PEL Laboratories, Inc.

2509258



Chain of Custody Record Record/Work Request

8405 Benjamin Rd, Suite A
Tampa, FL 33634
Phone: 813-888-9507
E-Mail: login@pelab.com

2509258 KC

Company: CHAZM HILL		Project Name/Number: SOP II / 364298.01. SL. R1. FW				Page 3 of 3						
Address: 727 N. First St., Suite 400 St. Louis, MO 63102		Project Manager: CHRIS ENGLISH				DEP Form #: 62-770.900(2) Form Title: Chain of Custody Record Effective Date: September 23, 1997 FDEP Facility No. Project Name:						
Phone: 314-335-3000 Fax: 314-421-3927		Purchase Order:				Sampling CompQAP No: Approval Date:						
Print Names(s) / Affiliation Anthony Swierczek, Glynn Roberts, Wayne Conway		Preservatives (see codes) I I				REQUESTED DUE DATE / /						
Sampler(s) Signature(s) 		Analyses Requested				Remarks Lab. No.						
Item No.	Field ID No.	Sampled Date	Sampled Time	Grab or Composite	Matrix (see codes)	Number of Containers	Arsenic	TCAP	Metals			
19	HA-16-S-00	05/13/08	1625	Composite	SO	2	X	X			24-Hz TAT 19	
20	HA-10-S-00	05/13/08	1635	↓	SO	2	X	X			20	
Shipment Method							← Total Number of Containers					
Out: 05/13/08		Via: FedEx		Item Nos.		Relinquished by / Affiliations		Date		Time		
Returned: / /		Via:						5/16/08 1446				
Additional Comments: Please Hold						5/13/08 1300		1620		5/14/08 830		
TCAP analyses for all samples on CCL until Arsenic data is received; will run the 5 highest arsenic locations for TCAP analyses for 10-day TAT.							Cooler No. (s) / Temperature(s) (C)		Sampling Kit No.		Equipment ID No.	
MATRIX CODES: A = Air GW = Groundwater SE = Sediment SO = Soil SW = Surface Water W = Water (Blanks) O = Other (specify)												
PRESERVATION CODES: H-Hydrochloric acid + ice I = Ice only N = Nitric acid + ice S = Sulfuric acid + ice O = Other (specify)												

2509258

54

FedEx Express® US Airbill

FedEx
Tracking
Number

8627 4831 7199

1 From **[Redacted]**
Date **2/10/04**

Sender's Name **[Redacted]** Phone **704 411 1111**

Company **[Redacted]**

Address **[Redacted]**

City **[Redacted]** State **NC** ZIP **27612**

2 Your Internal Billing Reference **36924801, SC, RI, FW/41500**

3 To Recipient's Name **[Redacted]** Phone **919 888 1111**

Company **[Redacted]**

Recipient's Address **[Redacted]**

Address **[Redacted]**

City **[Redacted]** State **NC** ZIP **27614**



8627 4831 7199

Recipient's Copy

4a Express Package Service

☒ FedEx Priority Overnight
Next business morning.* Friday shipments will be delivered on Monday unless SATURDAY Delivery is selected.

☐ FedEx Standard Overnight
Next business afternoon.* Saturday Delivery NOT available.

☐ FedEx First Overnight
Earliest next business morning delivery to select locations.* Saturday Delivery NOT available.

☐ FedEx 2Day
Second business day.* Thursday shipments will be delivered on Monday unless SATURDAY Delivery is selected.

☐ FedEx Express Saver
Third business day.* Saturday Delivery NOT available.

* To most locations.

4b Express Freight Service

☐ FedEx 1Day Freight*
Next business day.** Friday shipments will be delivered on Monday unless SATURDAY Delivery is selected.

☐ FedEx 2Day Freight
Second business day.** Thursday shipments will be delivered on Monday unless SATURDAY Delivery is selected.

☐ FedEx 3Day Freight
Third business day.** Saturday Delivery NOT available.

* Call for Confirmation. ** To most locations.

5 Packaging

☐ FedEx Envelope* ☐ FedEx Pak*
Includes FedEx Small Pak, FedEx Large Pak, and FedEx Sturdy Pak.

☐ FedEx Box ☐ FedEx Tube ☒ Other

* Declared value limit \$500.

6 Special Handling

☐ SATURDAY Delivery
Not available for FedEx Standard Overnight, FedEx First Overnight, FedEx Express Saver, or FedEx 2Day Freight.

☐ HOLD Weekday at FedEx Location
Not available for FedEx First Overnight.

☐ HOLD Saturday at FedEx Location
Available ONLY for FedEx Priority Overnight and FedEx 2Day to select locations.

Does this shipment contain dangerous goods?
One box must be checked.

☒ No ☐ Yes
As per attached Shipper's Declaration.

☐ Yes
Shipper's Declaration not required.

☐ Dry Ice
Dry Ice, 9 UN 1845 x kg

Dangerous goods (including dry ice) cannot be shipped in FedEx packaging.

☐ Cargo Aircraft Only

7 Payment Bill to:

☒ Sender
Acct. No. in Section 1 will be billed.

☐ Recipient ☐ Third Party ☐ Credit Card ☐ Cash/Check

[Redacted]

Total Packages **1** Total Weight **1.00** Total Declared Value* **\$ 0.00**

*Our liability is limited to \$100 unless you declare a higher value. See back for details.

Credit Card Auth.

8 Residential Delivery Signature Options

If you require a signature, check Direct or Indirect.

☐ No Signature Required
Package may be left without obtaining a signature for delivery.

☐ Direct Signature
Someone at recipient's address may sign for delivery. Fee applies.

☐ Indirect Signature
If no one is available at recipient's address, someone at a neighboring address may sign for delivery. Fee applies.

520

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fedex.com 1.800.GoFedEx 1.800.463.3339

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2509258

SAMPLE RECEIPT CONFIRMATION SHEET

Client Information

SDG:	2509258	Req:	85624
Client:	CH2M Hill	Project:	Hanley Area
Level:	3	Date Rec'd:	5/14/2008 8:30:00 AM
Rec'd via:	Fed-Ex	Due Date:	05/15/08

Sample Verification

Samples/Cooler Secure?	<input type="text" value="Yes"/>	All Samples on COC accounted For?	<input type="text" value="Yes"/>
Temperature of Samples(Celsius)	<input type="text" value="4.0C"/>	All Samples Rec'd Intact?	<input type="text" value="Yes"/>
pH Verified?	<input type="text" value="No"/>	Sample Vol. Stuff. For Analysis?	<input type="text" value="Yes"/>
pH WNL?	<input type="text" value="No"/>	Samples Rec'd W/I Hold Time?	<input type="text" value="Yes"/>
Soil Origin (Domestic/Foreign):	<input type="text" value="Domestic"/>	Are All Samples to be Analyzed?	<input type="text" value="Yes"/>
Site Location/Project on COC?	<input type="text" value="Yes"/>	Correct Sample Containers?	<input type="text" value="Yes"/>
Client Project # on COC?	<input type="text" value="Yes"/>	COC Comments written on COC?	<input type="text" value="Yes"/>
Project Mgr. Indicated on COC?	<input type="text" value="Yes"/>	Samplers Initials on COC?	<input type="text" value="Yes"/>
COC relinquished/Dated by Client?	<input type="text" value="Yes"/>	Sample Date/Time Indicated?	<input type="text" value="Yes"/>
COC Received/Dated by PEL?	<input type="text" value="Yes"/>	TAT Requested:	<input type="text" value="RUSH"/>
Specific Subcontract Indicated?	<input type="text" value="No"/>	Client Requests Verbal Results?	<input type="text" value="No"/>
Samples Received By	<input type="text" value="Fed-Ex"/>	Client Requests Faxed Results?	<input type="text" value="No"/>
PEL to Conduct ALL Analyses?	<input type="text" value="Yes"/>		

PEER REVIEW



Client: CH2M Hill

WONo: 2509258

Profile Name: SLOP2

Profile #: 85624

MATRIX S

Sample #	Parameter	Relinquished	Received	Date	Time
01 - 20	Dry Weight Dry Weight	KC	PL	5/14/08	1355
01 - 20	Dry Weight Dry Weight	PL	KC	5/14/08	1600
01 - 20	6010 Metals	KC	JK	5/14/8	1245
01 - 20	6010 Metals	JK	KC	5/14/8	1355

Additional:

Comments:

Addendum

Letter of Acceptance

Customer Name: CH2M Hill

Date and Time Received: 5/14/2008 8:30:00 AM

Date to be Reported: 5/15/2008 (prelims)

Laboratory Submission Number/SDG: 2509258

Get Detailed Analyte List here: www.pelab.com/webdms/Default.asp?LoaSDG=2509258

Project: SLOP RI / 364298.01.SL.RI.FW

Samples: The submission consisted of 20 samples with sample identification shown in the attached data tables.

Tests: The Samples will be analyzed for EPA methods: 6010.

Sample Custody/COC discrepancies:
None.

Notes:
24-hr TAT, prelims.

Distribution of Report to:

CH2M Hill
Attn: Dave Lee
Phone: W 314-421-0900

Note: Submitted material will be retained for 30 days unless otherwise requested by client or consumed in analysis. PEL letters and reports are for the exclusive use of the client to whom they are addressed. Our letters and reports apply to the sample tested and are not necessarily indicative of the qualities of apparently identical or similar materials

Log-in Report

Level: 3

Total of: 20 analyses on 20 samples (including QC)

15-May-08

Report/SDG #: 2509258

SampleID	LAB ID	StationID	Matrix	SampleDate	ReceiveDate
HA-01-S-00	250925801		SO	5/13/2008 10:30:00 AM	5/14/2008 8:30:00 AM

Method

6010

Metals

6010

SampleID	LAB ID	StationID	Matrix	SampleDate	ReceiveDate
HA-03-S-00	250925802		SO	5/13/2008 11:50:00 AM	5/14/2008 8:30:00 AM

Method

6010

Metals

6010

SampleID	LAB ID	StationID	Matrix	SampleDate	ReceiveDate
HA-03-S-00MS	250925803		SQ	5/13/2008 11:50:00 AM	5/14/2008 8:30:00 AM

Method

6010

Metals

6010

SampleID	LAB ID	StationID	Matrix	SampleDate	ReceiveDate
HA-03-S-00SD	250925804		SQ	5/13/2008 11:50:00 AM	5/14/2008 8:30:00 AM

Method

6010

Metals

6010

SampleID	LAB ID	StationID	Matrix	SampleDate	ReceiveDate
HA-02-S-00	250925805		SO	5/13/2008 11:55:00 AM	5/14/2008 8:30:00 AM

Method

6010

Metals

6010

SampleID	LAB ID	StationID	Matrix	SampleDate	ReceiveDate
HA-05-S-00	250925806		SO	5/13/2008 1:35:00 PM	5/14/2008 8:30:00 AM

Method

6010

Metals

6010

Report/SDG #: 2509258

SampleID	LAB ID	StationID	Matrix	SampleDate	ReceiveDate
HA-04-S-00	250925807		SO	5/13/2008 2:00:00 PM	5/14/2008 8:30:00 AM

Method

6010

Metals

6010

SampleID	LAB ID	StationID	Matrix	SampleDate	ReceiveDate
HA-06-S-00	250925808		SO	5/13/2008 2:15:00 PM	5/14/2008 8:30:00 AM

Method

6010

Metals

6010

SampleID	LAB ID	StationID	Matrix	SampleDate	ReceiveDate
HA-07-S-00	250925809		SO	5/13/2008 2:17:00 PM	5/14/2008 8:30:00 AM

Method

6010

Metals

6010

SampleID	LAB ID	StationID	Matrix	SampleDate	ReceiveDate
HA-08-S-00	250925810		SO	5/13/2008 2:30:00 PM	5/14/2008 8:30:00 AM

Method

6010

Metals

6010

SampleID	LAB ID	StationID	Matrix	SampleDate	ReceiveDate
HA-09-S-00	250925811		SO	5/13/2008 3:12:00 PM	5/14/2008 8:30:00 AM

Method

6010

Metals

6010

SampleID	LAB ID	StationID	Matrix	SampleDate	ReceiveDate
FD-S-051308A	250925812		SO	5/13/2008 3:15:00 PM	5/14/2008 8:30:00 AM

Method

6010

Metals

6010

Report/SDG #: 2509258

SampleID	LAB ID	StationID	Matrix	SampleDate	ReceiveDate
HA-11-S-00	250925813		SO	5/13/2008 3:40:00 PM	5/14/2008 8:30:00 AM

Method

6010

Metals

6010

SampleID	LAB ID	StationID	Matrix	SampleDate	ReceiveDate
HA-12-S-00	250925814		SO	5/13/2008 3:48:00 PM	5/14/2008 8:30:00 AM

Method

6010

Metals

6010

SampleID	LAB ID	StationID	Matrix	SampleDate	ReceiveDate
FD-S-051308B	250925815		SO	5/13/2008 3:45:00 PM	5/14/2008 8:30:00 AM

Method

6010

Metals

6010

SampleID	LAB ID	StationID	Matrix	SampleDate	ReceiveDate
HA-13-S-00	250925816		SO	5/13/2008 4:02:00 PM	5/14/2008 8:30:00 AM

Method

6010

Metals

6010

SampleID	LAB ID	StationID	Matrix	SampleDate	ReceiveDate
HA-14-S-00	250925817		SO	5/13/2008 4:07:00 PM	5/14/2008 8:30:00 AM

Method

6010

Metals

6010

SampleID	LAB ID	StationID	Matrix	SampleDate	ReceiveDate
HA-15-S-00	250925818		SO	5/13/2008 4:16:00 PM	5/14/2008 8:30:00 AM

Method

6010

Metals

6010

Report/SDG #: 2509258

SampleID	LAB ID	StationID	Matrix	SampleDate	ReceiveDate
HA-16-S-00	250925819		SO	5/13/2008 4:25:00 PM	5/14/2008 8:30:00 AM

Method

6010

Metals

6010

SampleID	LAB ID	StationID	Matrix	SampleDate	ReceiveDate
HA-10-S-00	250925820		SO	5/13/2008 4:35:00 PM	5/14/2008 8:30:00 AM

Method

6010

Metals

6010

Darcy Weisman

From: Darcy Weisman
Sent: Thursday, May 15, 2008 5:16 PM
To: 'Dave.Lee@ch2m.com'
Subject: SLOP / SDG 2509258 / prelims

Good afternoon Dave.
Please see attached.

Samples FD-S-051308A, HA-11-S-00 required a 1:2 dilution due to interference with the following analyte(s): Arsenic.

Please note our address has changed:

8405 Benjamin Road, Suite A
Tampa, FL 33634

Thanks,
Darcy

Darcy Weisman
Project Manager, Tampa Division
PEL, a Division of Spectrum Analytical Featuring Hanibal Technology
phone/cell: 813-476-2481
fax: 800-480-6435
email: dweisman@pelab.com

This e-mail is intended for the named addressee(s) and may contain information that is confidential and proprietary. If this information is received by anyone other than the named addressee(s), the recipient(s) should immediately notify the sender by e-mail and promptly delete the transmitted material. In no event shall this material be read, used, stored, or retained by anyone other than the named addressee(s) without the express written consent of the sender or the named addressee(s).

CASE NARRATIVE METALS

PEL Lab Reference No./SDG: 2509258

Client: CH2M Hill

I. RECEIPT

No exceptions were encountered unless a Sample Receipt Exception Report is attached to the Chain-of-Custody or a communication form is included in the addendum with this package.

II. HOLDING TIMES

A. Sample Preparation: All holding times were met.

B. Sample Analysis: All holding times were met.

III. METHOD

Analyses were performed according to the PEL, a Division of Spectrum Analytical, Standard Operating Procedures and EPA Method 6010B for ICP metals.

IV. PREPARATION

Soil samples were prepared according to PEL Laboratory's Standard Operating Procedures and EPA Method 3050B.

V. ANALYSIS

A. Calibration:

All acceptance criteria were met.

B. Blanks:

1. Calibration Blanks:

All acceptance criteria were met.

2. Method Blanks:

All acceptance criteria were met.

C. Spikes:

1. Laboratory Control Spikes (LCS):

An LCS/LCSD set was analyzed.

All percent recovery and relative percent difference (RPD) criteria were met.

2. Post Digestion Spike:

All acceptance criteria were met.

**CASE NARRATIVE
METALS**

PEL Lab Reference No./SDG: 2509258

Client: CH2M Hill

3. Matrix Spike/Matrix Spike Duplicate Samples (MS/SD):

A client requested MS/SD set was analyzed.
All percent recovery and relative percent difference (RPD) criteria were met.

D. Duplicate:

No sample duplicates are reported with this method. (Spike duplicates are referenced above in section C. Spikes.)

E. Serial Dilution:

All acceptance criteria were met.

F. ICP Interference Check Samples:

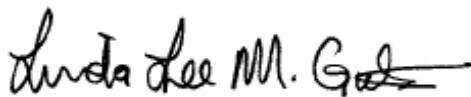
All acceptance criteria were met.

G. Samples:

Sample analysis proceeded normally.

Samples FD-S-051308A, HA-11-S-00 required a 1:2 dilution due to interference with the following analyte(s): Arsenic.

I certify that this data package is in compliance with the terms and conditions agreed to by the client and PEL, both technically and for completeness, except for the conditions noted above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designated person, as, verified by the following signature.



SIGNED:

DATE: 05/15/2008

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: PEL, Spectrum Analytical, Inc. Contract: SLOP RI / 364298.01.SL.RI.FW

HA-01-S-00

Lab Code : PEL

Case No.

SAS No:

SDG No.: 2509258

Matrix: SOIL

Lab Sample ID: 250925801

Level:(low/med) LOW

Date Received: 5/14/2008

PercentSolids: 79.7

Station ID:

CONCENTRATION UNITS: MG/KG

CAS NO.	ANALYTE	Concentration	C	Q	M
7440-38-2	Arsenic	8.82			P

Color Before: _____

Clarity Before: _____

Texture : _____

Color After : _____

Clarity After: _____

Artifacts: _____

Comments:

150508 1711

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: PEL, Spectrum Analytical, Inc. Contract: SLOP RI / 364298.01.SL.RI.FW

HA-03-S-00

Lab Code : PEL

Case No.

SAS No:

SDG No.: 2509258

Matrix: SOIL

Lab Sample ID: 250925802

Level:(low/med) LOW

Date Received: 5/14/2008

PercentSolids: 80.3

Station ID:

CONCENTRATION UNITS: MG/KG

CAS NO.	ANALYTE	Concentration	C	Q	M
7440-38-2	Arsenic	10			P

Color Before: _____

Clarity Before: _____

Texture : _____

Color After : _____

Clarity After: _____

Artifacts: _____

Comments:

150508 1711

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1

INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: PEL, Spectrum Analytical, Inc. Contract: SLOP RI / 364298.01.SL.RI.FW

HA-02-S-00

Lab Code : PEL

Case No.

SAS No:

SDG No.: 2509258

Matrix: SOIL

Lab Sample ID: 250925805

Level:(low/med) LOW

Date Received: 5/14/2008

PercentSolids: 82.2

Station ID:

CONCENTRATION UNITS: MG/KG

CAS NO.	ANALYTE	Concentration	C	Q	M
7440-38-2	Arsenic	9.41			P

Color Before: _____

Clarity Before: _____

Texture : _____

Color After : _____

Clarity After: _____

Artifacts: _____

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: PEL, Spectrum Analytical, Inc. Contract: SLOP RI / 364298.01.SL.RI.FW

HA-05-S-00

Lab Code : PEL

Case No.

SAS No:

SDG No.: 2509258

Matrix: SOIL

Lab Sample ID: 250925806

Level:(low/med) LOW

Date Received: 5/14/2008

PercentSolids: 82

Station ID:

CONCENTRATION UNITS: MG/KG

CAS NO.	ANALYTE	Concentration	C	Q	M
7440-38-2	Arsenic	36.3			P

Color Before: _____

Clarity Before: _____

Texture : _____

Color After : _____

Clarity After: _____

Artifacts: _____

Comments:

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1

INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: PEL, Spectrum Analytical, Inc. Contract: SLOP RI / 364298.01.SL.RI.FW

HA-04-S-00

Lab Code : PEL

Case No.

SAS No:

SDG No.: 2509258

Matrix: SOIL

Lab Sample ID: 250925807

Level:(low/med) LOW

Date Received: 5/14/2008

PercentSolids: 84.2

Station ID:

CONCENTRATION UNITS: MG/KG

CAS NO.	ANALYTE	Concentration	C	Q	M
7440-38-2	Arsenic	5.94			P

Color Before: _____

Clarity Before: _____

Texture : _____

Color After : _____

Clarity After: _____

Artifacts: _____

Comments:

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1

INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: PEL, Spectrum Analytical, Inc. Contract: SLOP RI / 364298.01.SL.RI.FW

HA-06-S-00

Lab Code : PEL

Case No.

SAS No:

SDG No.: 2509258

Matrix: SOIL

Lab Sample ID: 250925808

Level:(low/med) LOW

Date Received: 5/14/2008

PercentSolids: 79.6

Station ID:

CONCENTRATION UNITS: MG/KG

CAS NO.	ANALYTE	Concentration	C	Q	M
7440-38-2	Arsenic	18.2			P

Color Before: _____

Clarity Before: _____

Texture : _____

Color After : _____

Clarity After: _____

Artifacts: _____

Comments:

150508 1711

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1

INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: PEL, Spectrum Analytical, Inc. Contract: SLOP RI / 364298.01.SL.RI.FW

HA-07-S-00

Lab Code : PEL

Case No.

SAS No:

SDG No.: 2509258

Matrix: SOIL

Lab Sample ID: 250925809

Level:(low/med) LOW

Date Received: 5/14/2008

PercentSolids: 80.3

Station ID:

CONCENTRATION UNITS: MG/KG

CAS NO.	ANALYTE	Concentration	C	Q	M
7440-38-2	Arsenic	8.11			P

Color Before: _____

Clarity Before: _____

Texture : _____

Color After : _____

Clarity After: _____

Artifacts: _____

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: PEL, Spectrum Analytical, Inc. Contract: SLOP RI / 364298.01.SL.RI.FW

HA-08-S-00

Lab Code : PEL

Case No.

SAS No:

SDG No.: 2509258

Matrix: SOIL

Lab Sample ID: 250925810

Level:(low/med) LOW

Date Received: 5/14/2008

PercentSolids: 80.2

Station ID:

CONCENTRATION UNITS: MG/KG

CAS NO.	ANALYTE	Concentration	C	Q	M
7440-38-2	Arsenic	7.39			P

Color Before: _____

Clarity Before: _____

Texture : _____

Color After : _____

Clarity After: _____

Artifacts: _____

Comments:

150508 1711

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: PEL, Spectrum Analytical, Inc. Contract: SLOP RI / 364298.01.SL.RI.FW

HA-09-S-00

Lab Code : PEL

Case No.

SAS No:

SDG No.: 2509258

Matrix: SOIL

Lab Sample ID: 250925811

Level:(low/med) LOW

Date Received: 5/14/2008

PercentSolids: 80.9

Station ID:

CONCENTRATION UNITS: MG/KG

CAS NO.	ANALYTE	Concentration	C	Q	M
7440-38-2	Arsenic	5.9			P

Color Before: _____

Clarity Before: _____

Texture : _____

Color After : _____

Clarity After: _____

Artifacts: _____

Comments:

150508 1711

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: PEL, Spectrum Analytical, Inc. Contract: SLOP RI / 364298.01.SL.RI.FW

FD-S-051308A

Lab Code : PEL

Case No.

SAS No:

SDG No.: 2509258

Matrix: SOIL

Lab Sample ID: 250925812

Level:(low/med) LOW

Date Received: 5/14/2008

PercentSolids: 85.3

Station ID:

CONCENTRATION UNITS: MG/KG

CAS NO.	ANALYTE	Concentration	C	Q	M
7440-38-2	Arsenic	7.09			P

Color Before: _____

Clarity Before: _____

Texture : _____

Color After : _____

Clarity After: _____

Artifacts: _____

Comments:

150508 1711

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: PEL, Spectrum Analytical, Inc. Contract: SLOP RI / 364298.01.SL.RI.FW

HA-11-S-00

Lab Code : PEL

Case No.

SAS No:

SDG No.: 2509258

Matrix: SOIL

Lab Sample ID: 250925813

Level:(low/med) LOW

Date Received: 5/14/2008

PercentSolids: 83.9

Station ID:

CONCENTRATION UNITS: MG/KG

CAS NO.	ANALYTE	Concentration	C	Q	M
7440-38-2	Arsenic	9.42			P

Color Before: _____

Clarity Before: _____

Texture : _____

Color After : _____

Clarity After: _____

Artifacts: _____

Comments:

150508 1711

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: PEL, Spectrum Analytical, Inc. Contract: SLOP RI / 364298.01.SL.RI.FW

HA-12-S-00

Lab Code : PEL

Case No.

SAS No:

SDG No.: 2509258

Matrix: SOIL

Lab Sample ID: 250925814

Level:(low/med) LOW

Date Received: 5/14/2008

PercentSolids: 78.7

Station ID:

CONCENTRATION UNITS: MG/KG

CAS NO.	ANALYTE	Concentration	C	Q	M
7440-38-2	Arsenic	8.41			P

Color Before: _____

Clarity Before: _____

Texture : _____

Color After : _____

Clarity After: _____

Artifacts: _____

Comments:

150508 1711

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: PEL, Spectrum Analytical, Inc. Contract: SLOP RI / 364298.01.SL.RI.FW

FD-S-051308B

Lab Code : PEL

Case No.

SAS No:

SDG No.: 2509258

Matrix: SOIL

Lab Sample ID: 250925815

Level:(low/med) LOW

Date Received: 5/14/2008

PercentSolids: 83.1

Station ID:

CONCENTRATION UNITS: MG/KG

CAS NO.	ANALYTE	Concentration	C	Q	M
7440-38-2	Arsenic	9.02			P

Color Before: _____

Clarity Before: _____

Texture : _____

Color After : _____

Clarity After: _____

Artifacts: _____

Comments:

150508 1711

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: PEL, Spectrum Analytical, Inc. Contract: SLOP RI / 364298.01.SL.RI.FW

HA-13-S-00

Lab Code : PEL

Case No.

SAS No:

SDG No.: 2509258

Matrix: SOIL

Lab Sample ID: 250925816

Level:(low/med) LOW

Date Received: 5/14/2008

PercentSolids: 80.9

Station ID:

CONCENTRATION UNITS: MG/KG

CAS NO.	ANALYTE	Concentration	C	Q	M
7440-38-2	Arsenic	9.05			P

Color Before: _____

Clarity Before: _____

Texture : _____

Color After : _____

Clarity After: _____

Artifacts: _____

Comments:

150508 1711

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: PEL, Spectrum Analytical, Inc. Contract: SLOP RI / 364298.01.SL.RI.FW

HA-14-S-00

Lab Code : PEL

Case No.

SAS No:

SDG No.: 2509258

Matrix: SOIL

Lab Sample ID: 250925817

Level:(low/med) LOW

Date Received: 5/14/2008

PercentSolids: 80.9

Station ID:

CONCENTRATION UNITS: MG/KG

CAS NO.	ANALYTE	Concentration	C	Q	M
7440-38-2	Arsenic	8.19			P

Color Before: _____

Clarity Before: _____

Texture : _____

Color After : _____

Clarity After: _____

Artifacts: _____

Comments:

150508 1711

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1

INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: PEL, Spectrum Analytical, Inc. Contract: SLOP RI / 364298.01.SL.RI.FW

HA-15-S-00

Lab Code : PEL

Case No.

SAS No:

SDG No.: 2509258

Matrix: SOIL

Lab Sample ID: 250925818

Level:(low/med) LOW

Date Received: 5/14/2008

PercentSolids: 80.6

Station ID:

CONCENTRATION UNITS: MG/KG

CAS NO.	ANALYTE	Concentration	C	Q	M
7440-38-2	Arsenic	9.14			P

Color Before: _____

Clarity Before: _____

Texture : _____

Color After : _____

Clarity After: _____

Artifacts: _____

Comments:

150508 1711

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INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: PEL, Spectrum Analytical, Inc. Contract: SLOP RI / 364298.01.SL.RI.FW

HA-16-S-00

Lab Code : PEL

Case No.

SAS No:

SDG No.: 2509258

Matrix: SOIL

Lab Sample ID: 250925819

Level:(low/med) LOW

Date Received: 5/14/2008

PercentSolids: 81.8

Station ID:

CONCENTRATION UNITS: MG/KG

CAS NO.	ANALYTE	Concentration	C	Q	M
7440-38-2	Arsenic	5.47			P

Color Before: _____

Clarity Before: _____

Texture : _____

Color After : _____

Clarity After: _____

Artifacts: _____

Comments:

150508 1711

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: PEL, Spectrum Analytical, Inc. Contract: SLOP RI / 364298.01.SL.RI.FW

HA-10-S-00

Lab Code : PEL

Case No.

SAS No:

SDG No.: 2509258

Matrix: SOIL

Lab Sample ID: 250925820

Level:(low/med) LOW

Date Received: 5/14/2008

PercentSolids: 85.6

Station ID:

CONCENTRATION UNITS: MG/KG

CAS NO.	ANALYTE	Concentration	C	Q	M
7440-38-2	Arsenic	8.06			P

Color Before: _____

Clarity Before: _____

Texture : _____

Color After : _____

Clarity After: _____

Artifacts: _____

Comments:

150508 1711

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BLANKS

Lab Name: PEL, Spectrum Analytical, Inc.

Contract: SLOP RI / 364298.01.SL.RI.FW

Lab Code : PEL

Case No.

SAS No:

SDG No.: 2509258

Preparation Blank Matrix (water/soil):

SOIL

Preparation Blank Concentration Units (ug/L or mg/Kg):

MG/KG

Analyte	Initial Calib. Blank (ug/L)		Continuing Calibration Blank (ug/L)						Preparation Blank		M
		C	C		C		C		C		
Arsenic	5	U	5	U	5	U	5	U	0.5	U	P

ICB IDs: P= ICB604537

CCB1 IDs: P= CCB604542

CCB2 IDs: P= CCB604554

CCB3 IDs: P= CCB604555

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BLANKS

Lab Name: PEL, Spectrum Analytical, Inc.

Contract: SLOP RI / 364298.01.SL.RI.FW

Lab Code : PEL

Case No.

SAS No:

SDG No.: 2509258

Preparation Blank Matrix (water/soil):

Preparation Blank Concentration Units (ug/L or mg/Kg):

Analyte	Initial Calib. Blank (ug/L)		Continuing Calibration Blank (ug/L)						Preparation Blank		M
		C	C		C		C		C		
Arsenic			5	U	5	U	5	U			P

ICB IDs:

CCB1 IDs: P= CCB604568

CCB2 IDs: P= CCB604580

CCB3 IDs: P= CCB604592

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5A

SPIKE SAMPLE RECOVERY

EPA Sample No.

HA-03-S-00MS

Lab Name: PEL, Spectrum Analytical

Contract: SLOP RI / 364298.01.SL.RI.

Lab Code : PEL

Case No.

SAS No:

SDG No.: 2509258

Matrix: SOIL

Level:(low/med) LOW

% Solids for Sample: 80.3

Concentration Units (mg/L or mg/kg): MG/KG

Analyte	Control Limit %R	Spiked Sample		Sample Result (SR)		Spike Added (SA)	%R	Q	M
Arsenic	75 - 125	52	C	10	C	43.9	95.7		P

Comments:

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5A

SPIKE SAMPLE RECOVERY

EPA Sample No.

HA-03-S-00SD

Lab Name: PEL, Spectrum Analytical

Contract: SLOP RI / 364298.01.SL.RI.

Lab Code : PEL

Case No.

SAS No:

SDG No.: 2509258

Matrix: SOIL

Level:(low/med) LOW

% Solids for Sample: 80.3

Concentration Units (mg/L or mg/kg): MG/KG

Analyte	Control Limit %R	Spiked Sample		Sample Result (SR)		Spike Added (SA)	%R	Q	M
Arsenic	75 - 125	49.8	C	10	C	43.7	91.1		P

Comments:

U.S. EPA - CLP

5B

POST DIGEST SPIKE SAMPLE RECOVERY

EPA Sample No.

HA-03-S-00A

Lab Name: PEL, Spectrum Analytical, Inc. Contract: SLOP RI / 364298.01.SL.RI.

Lab Code : PEL Case No. SAS No: SDG No.: 2509258

Matrix: Soil Level:(low/med) LOW

Concentration Units (ug/L or mg/kg): ug/L

Analyte	Control Limit %R	Spiked Sample C	Sample Result (SR) C	Spike Added (SA)	%R	Q	M
Arsenic	80 - 120	602.00	114.60	500	97.6		P

Comments:

U.S. EPA - CLP
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DUPLICATES

EPA Sample No.
262202LCSD

Lab Name: PEL, Spectrum Analytical Contract: SLOP RI / 364298.01.SL.RI.F

Lab Code : PEL Case No. SAS No: SDG No.: 2509258

Matrix: SOIL Level:(low/med) LOW

% Solids for Sample: 100 % Solids for Duplicate: 100

Concentration Units (mg/L or mg/kg): MG/KG

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Arsenic	20	48.4		49.2		1.6		P

Comments:

U.S. EPA - CLP
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DUPLICATES

EPA Sample No.
HA-03-S-00SD

Lab Name: PEL, Spectrum Analytical Contract: SLOP RI / 364298.01.SL.RI.F

Lab Code : PEL Case No. SAS No: SDG No.: 2509258

Matrix: SOIL Level:(low/med) LOW

% Solids for Sample: 80.3 % Solids for Duplicate: 80.3

Concentration Units (mg/L or mg/kg): MG/KG

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Arsenic	20	52		49.8		4.3		P

Comments:

U.S. EPA - CLP

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LABORATORY CONTROL SAMPLE

EPA Sample No.

Lab Name: PEL, Spectrum Analytical

Contract: SLOP RI / 364298.01.SL.RI.

262201LCS

Lab Code : PEL

Case No.

SAS No:

SDG No.: 2509258

Solid LCS Source: 23554, 22381

Aqueous LCS Source:

Analyte	Aqueous			Solid (MG/KG)						
	True	Found	%R	True	Found	C	Limits			%R
Arsenic				50	48.4		80	-	120	96.8

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LABORATORY CONTROL SAMPLE

EPA Sample No.

Lab Name: PEL, Spectrum Analytical

Contract: SLOP RI / 364298.01.SL.RI.

262202LCSD

Lab Code : PEL

Case No.

SAS No:

SDG No.: 2509258

Solid LCS Source: 23554, 22381

Aqueous LCS Source:

Analyte	Aqueous			Solid (MG/KG)						
	True	Found	%R	True	Found	C	Limits		%R	
Arsenic				50	49.2		80	- 120	98.4	



PEL a division of Spectrum Analytical, Inc.

featuring HANIBAL TECHNOLOGY



Customer Name: CH2M Hill
Date and Time Received: 5/15/2008 8:40:00 AM
Date Reported: 5/19/2008
Laboratory Submission Number/SDG: 2509265
Project: 364298.01.SL.RI.FW

Samples: The submission consisted of 5 samples with sample identification shown in the attached data tables.

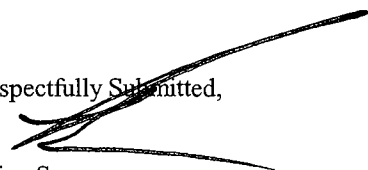
Tests: The samples were analyzed for the methods listed on the attached table of contents.

Results: See the attached data tables for results.

Distribution of Report to:

CH2M Hill
Attn: Dave Lee
Phone: W 314-421-0900

Respectfully Submitted,


Brian Spann
Laboratory Director
PEL a division of Spectrum Analytical, Inc.
featuring Hanibal Technology

Note: Submitted material will be retained for 30 days unless otherwise requested by client or consumed in analysis. PEL letters and reports are for the exclusive use of the client to whom they are addressed. Our Letters and reports apply to the sample tested and are not necessarily indicative of the qualities of apparently identical or similar materials

8405 Benjamin Road, Suite A • Tampa, Florida 33634
813-888-9507 • FAX: 800-480-6435
Website: www.pelab.com

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Chain of Custody Documentation	32
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EXECUTIVE SUMMARY - Detection Highlights

2509265

SAMPLE ID: FD-051408B

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
Lead	15	0.563	MG/KG	SW6010B

SAMPLE ID: HA-20-S-00

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
Lead	54.8	0.531	MG/KG	SW6010B

SAMPLE ID: HA-21-S-00

PARAMETER	RESULT	REPORTING LIMIT	UNITS	ANALYTICAL METHOD
Lead	31 N	0.64	MG/KG	SW6010B

Inorganics

Inorganic Data Qualifiers

C (Concentration) Qualifier - Entries and their meanings are:

- B** The reported value obtained was less than the RL but greater than or equal to the MDL.
- E** The reported value obtained was over calibration or linear range.
- U** The reported value obtained was less than the MDL or was not detected.

Q Qualifier - Entries and their meanings are:

- U** The reported value is estimated because of interference. An explanatory comment must be included under "Comments" on the Cover Page if the problem applies to all samples in this data package or on the individual FORM 1 if it is an isolated problem.
- M** Duplicate injection precision was not met (two analyses of the same sample did not agree).
- N** Spiked sample recovery not within control limits.
- E** Serial Dilution percent difference not within control limits.
- S** The reported value was determined by the Method of Standard Additions (MSA).
- W** Post-digestion spike for Furnace AA analysis is out of control limits (85-115%) while sample absorbance is less than 50% of spike absorbance.
- *** Duplicate analysis not within control limits.
- +** Correlation coefficient for the MSA is less than 0.995.
- X** The data is flagged as rejected by analyst utilizing analytical judgement.

Entering "S", "W", or "+" is mutually exclusive. No combination of these qualifiers can appear in the same field.

M (Method) Qualifier - Enter one of the following:

- P** ICP
- A** Flame AA
- F** Furnace AA
- CV** Manual Cold Vapor AA
- TC** Total Organic Carbon
- AS** Semi-Automated Spectrophotometric
- CA** Midi-Distillation Spectrophotometric
- T** Titrimetric
- C** Manual Spectrophotometric
- GR** Gravimetric
- NR** Analyte was not required by your lab

Inorganic Sample ID Qualifiers

The qualifiers that may be appended to the lab sample ID and/or the client sample ID for inorganic analysis are defined below:

- DL** Diluted reanalysis. Indicates that the results of the original analysis of the sample contained compounds that exceeded the calibration range. The sample was diluted and reanalyzed. May be followed by a digit to indicate multiple dilutions of the sample. The results of more than one diluted reanalysis may be reported.
- R** Reanalysis. The extract was reanalyzed without re-extraction. The "R" is not used if the sample was also re-extracted. May be followed by a digit to indicate multiple reanalysis of the sample at the same dilution.
- RE** Re-extracted. The extract was reanalyzed with re-extraction. May be followed by a digit to indicate multiple re-extraction of the same sample at the same dilution.
- MS** Matrix spike (may be followed by a digit to indicate multiple matrix within a sample set).
- SD** Matrix spike duplicate (may be followed by a digit to indicate multiple matrix spike duplicate within a sample set).
- A** Post Digestion Spike.
- L** Serial Dilution.

METALS DATA PACKAGE TOTALS

CASE NARRATIVE METALS

PEL Lab Reference No./SDG: 2509265

Client: CH2M Hill

I. RECEIPT

No exceptions were encountered unless a Sample Receipt Exception Report is attached to the Chain-of-Custody or a communication form is included in the addendum with this package.

II. HOLDING TIMES

A. Sample Preparation: All holding times were met.

B. Sample Analysis: All holding times were met.

III. METHOD

Analyses were performed according to the PEL, a Division of Spectrum Analytical, Standard Operating Procedures and EPA Method 6010B for ICP metals.

IV. PREPARATION

Soil samples were prepared according to PEL Laboratory's Standard Operating Procedures and EPA Method 3050B.

V. ANALYSIS

A. Calibration:

All acceptance criteria were met.

B. Blanks:

1. Calibration Blanks:

All acceptance criteria were met.

2. Method Blanks:

All acceptance criteria were met.

C. Spikes:

1. Laboratory Control Spikes (LCS):

An LCS/LCSD set was analyzed.

All percent recovery and relative percent difference (RPD) criteria were met.

2. Post Digestion Spike:

All acceptance criteria were met.

**CASE NARRATIVE
METALS**

PEL Lab Reference No./SDG: 2509265

Client: CH2M Hill

3. Matrix Spike/Matrix Spike Duplicate Samples (MS/SD):

A client requested MS/SD set was analyzed.
All percent recovery and relative percent difference (RPD) criteria were met with the exception of:
SD - HA-21-S-00SD was analyzed with the soil samples on 05/16/08. The following analyte(s) were recovered below criteria: Lead at 69.7 % with criteria of (75-125).
Samples coded accordingly.

D. Duplicate:

No sample duplicates are reported with this method. (Spike duplicates are referenced above in section C. Spikes.)

E. Serial Dilution:

All acceptance criteria were met.

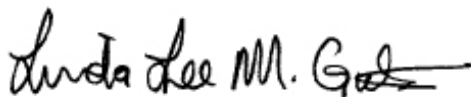
F. ICP Interference Check Samples:

All acceptance criteria were met.

G. Samples:

Sample analysis proceeded normally.

I certify that this data package is in compliance with the terms and conditions agreed to by the client and PEL, both technically and for completeness, except for the conditions noted above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or designated person, as, verified by the following signature.



SIGNED:

DATE: 05/16/2008

U.S. EPA - CLP
COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Lab Name: PEL, Spectrum Analytical, Inc. Contract: 364298.01.SL.RI.FW
Lab Code : PEL Case No.: SDG No.: 2509265
SOW No.:

EPA Sample No	Lab Sample ID
<u>HA-20-S-00</u>	<u>250926501</u>
<u>FD-051408B</u>	<u>250926502</u>
<u>HA-21-S-00</u>	<u>250926503</u>

Were ICP interelement corrections applied? Yes/No Yes

Were ICP background corrections applied? Yes/No Yes

If yes - were raw data generated before
application of background corrections? Yes/No No

Comments:

Sample Data

190508 1027

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: PEL, Spectrum Analytical, Inc. Contract: 364298.01.SL.RI.FW

FD-051408B

Lab Code : PEL Case No.: _____ SAS No: _____ SDG No.: 2509265Matrix: SOIL Lab Sample ID: 250926502Level:(low/med) LOW Date Received: 5/15/2008PercentSolids: 84.7 Station ID: _____CONCENTRATION UNITS: MG/KG

CAS NO.	ANALYTE	Concentration	C	Q	M
7439-92-1	Lead	15			P

Color Before: _____ Clarity Before: _____ Texture : _____

Color After : _____ Clarity After: _____ Artifacts: _____

Comments:

190508 1027

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA Sample No.

Lab Name: PEL, Spectrum Analytical, Inc. Contract: 364298.01.SL.RI.FW

HA-21-S-00

Lab Code : PEL Case No.: _____ SAS No: _____ SDG No.: 2509265Matrix: SOIL Lab Sample ID: 250926503Level:(low/med) LOW Date Received: 5/15/2008PercentSolids: 86.8 Station ID: _____CONCENTRATION UNITS: MG/KG

CAS NO.	ANALYTE	Concentration	C	Q	M
7439-92-1	Lead	31		N	P

Color Before: _____ Clarity Before: _____ Texture : _____

Color After : _____ Clarity After: _____ Artifacts: _____

Comments:

190508 1027